

YOGIC THERAPY



SWAMI KUALAYANANDA AND DR. S. L. VINEKAR

CENTRAL HEALTH EDUCATION BUREAU
MINISTRY OF HEALTH NEW DELHI

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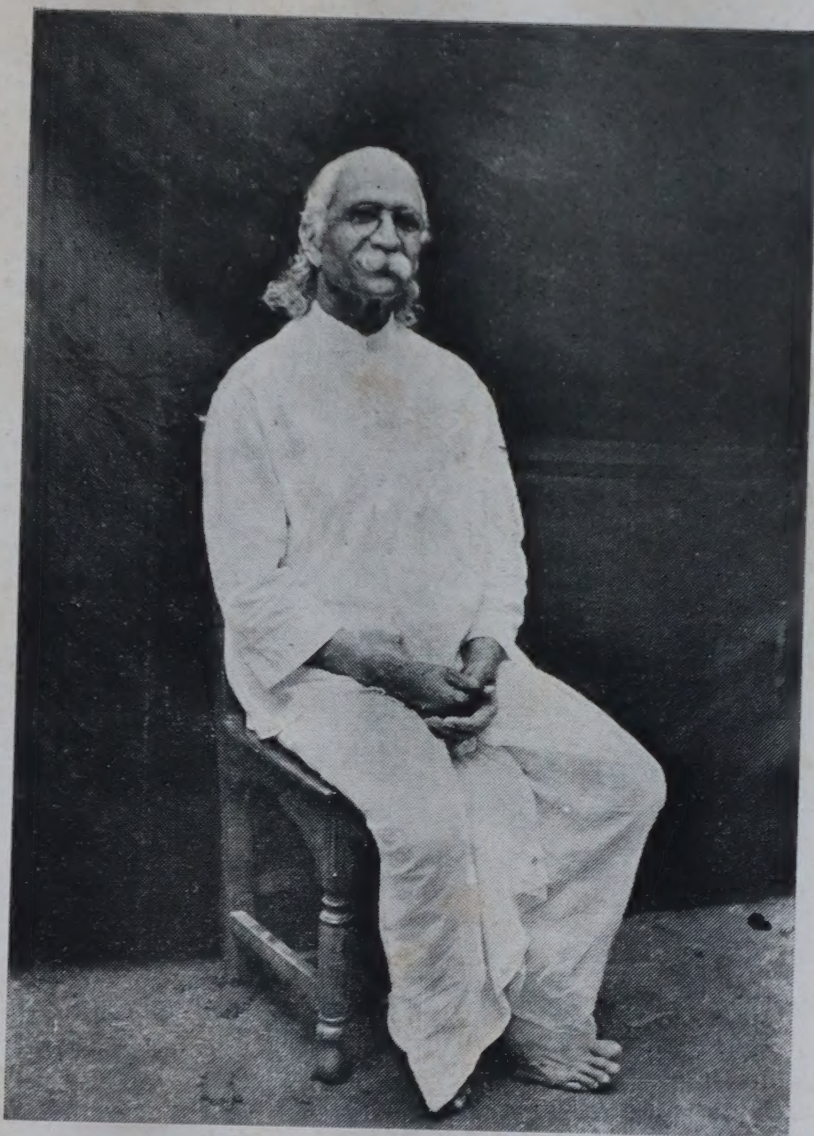
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Late Swami Kuvalayananda
30 August 1883—18 April 1966



Dr S. L. Vinekar
4 July 1907—21 December 1967

PREFACE TO THE FIRST EDITION

This booklet was specially written at the wishes of the Ministry of Health, Government of India to give the public in general, and medical men in particular, an idea of the basic principles of Yogic Therapy and its methods.

Yogic Therapy is gaining more and more popularity every day. The country is full of small and big institutions and persons who claim to cure diseases by 'Yogic' methods and most of these seem to carry on very well ! Not all of them may be able to prove their *bona fides* in the field. But this is quite natural so long as there is no official standardization which, for a young therapy like the 'Yogic', will necessarily take long to attain. Mere numerical strength of its practitioners may not prove the efficacy of a system, but it does go a long way to show that, to attain such a popularity, it must have some value of its own. It should be noted that many medical practitioners who were initially inclined to look upon this therapy with scepticism and suspicion have come to recognise its merits after gaining experience. Specialists in psychosomatic medicine and psychiatry especially, both in this country and abroad, have come to show a good deal of interest in this therapy, as it is felt by them that Yoga helps to eliminate the psycho-physical tensions which they find lingering on in their patients even after their recovery from mental and nervous disorders. Many members of the medical profession have by now come to value the contribution that Yoga can offer in the field of physiotherapy and rehabilitation of patients suffering from chronic disorders. It would, therefore, be rash to treat the therapy lightly or to denounce it as unscientific.

Neither is it enough for us to dote upon the methods just because they were handed down to us by our forefathers, or that they belong to a class of 'holy men' who must have only the good of the people at heart. Mere good wishes on the part of its protagonists or our national or racial sentiments for the therapy should not lead us to have blind faith in it. It should be our duty to verify its results and to explore the exact psycho-physiological mechanisms of the channels through which these results are obtained. Fortunately, the rapid and great advance that modern science is making in all fields helps one to get a better insight into these processes.

The authors' bias towards Yoga may have reflected itself in their writings. But it has been their endeavour all the time to keep an objective outlook. The major portion of the text deals mostly with fundamental concepts on established facts in biological sciences and, as such, may not require extensive documentation. Whenever a theory of a particular school or author or some controversial matter has been presented, it has been documented by references either to names of authors or the exact passages. Occasionally, the authors have dared to introduce new interpretations based on their own personal study and experience.

Although both the authors have participated in the revision and checking of the whole text, wherever a theoretical position or bias of one author was strong, the other tended to defer to the views of the author responsible for the original draft. The text was prepared mostly by the junior author under the direct guidance and supervision of the senior one.

The aim of the booklet, as said above, is to explain to the lay public, as well as medical men, the principles on which the various procedures of Yogic Therapy are based (principles, so far as they can be gauged in the light of modern science), the special field of application of the therapy, and, last but not the least, its limitations and contra-indications. In short, its purpose is to present a comprehensive picture of the scientific aspect and rationale of Yogic Therapy in the layman's language, as far as possible. But in a text like this, one cannot avoid using technical terms. To help understand the same, a glossary has been added at the end of this book.

We wish to thank the Union Health Ministry, especially Shri D. P. Karmarkar, Minister of Health, Government of India, for granting us the proud privilege to present this interesting topic to the public. Our thanks are also due to the staff of the Kaivalyadhama S.M.Y.M. Samiti for their helpful and constructive criticism and also in preparing diagrams, graphs and sketches that are presented in this book.

28th October, 1961

KUVALAYANANDA

S. L. VINEKAR

PREFACE TO THE SECOND EDITION

It is unfortunate that both the authors, Swami Kuvalayanandaji (deceased on 18-4-1966) and Dr. S. L. Vinekar (deceased on 21-12-1967) are no longer with us to see the second impression of this book.

The value of this work can be judged from the fact that it has aroused a great interest in Yoga all over the world during these years. Requests for translation into various languages have been received from this country and abroad and editions in some of these languages are under preparation.

The necessity of a thorough revision of the book was felt by the original authors and it may become imperative to do so in future. This will require some considerable time.

Because of the pressing demand for and unavailability of the book, which is the only one of its kind, we feel that the book should be reprinted in the original form. Those who are interested to know about further researches in the field of Yoga may visit the Research Department and refer to the Yoga-Mimamsa Journal published by Kaivalyadhama, Lonavla, Distt. Poona.

We thank the Ministry of Health for taking interest in publication of this impression.

14th September, 1968

SWAMI DIGAMBARJI
Director of Research & Chairman,
Kaivalyadhama S.M.Y.M. Samiti,
LONAVLA

C O N T E N T S

CHAPTER		PAGE
	PREFACE TO THE FIRST EDITION	(i)
	PREFACE TO THE SECOND EDITION	(iii)
	INTRODUCTION	(vii)
I	Concept of Disease in Yoga and Principles of Yogic Treatment	1
II	Cultivation of Correct Psychological Attitudes	6
III	Reconditioning of Psycho-Physiological Mechanism	20
IV	Other Yogic Therapeutical Procedures and Yogic Principles of Diet	55
V	Dhyāna as a Great Tranquilliser	74
	Epilogue	78

APPENDICES

A—A Schedule in Yogic Physical Culture Recommended for Persons of Average Health	80
B—References	87
C—Glossary	89

LIST OF ILLUSTRATIONS

Figure

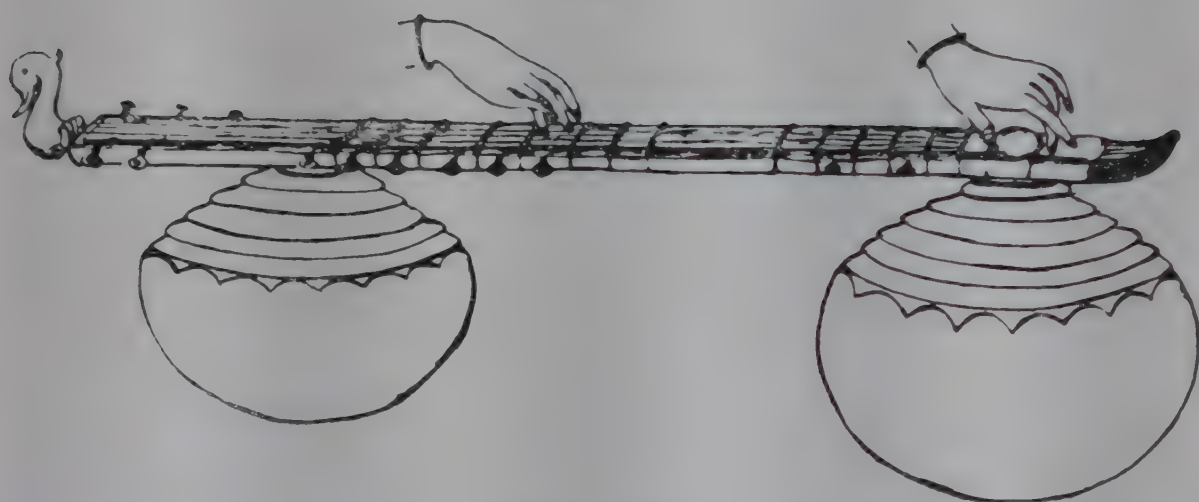
1. 'Yoga is Harmony'
2. 'Mind tells the Body and the Body tells the Mind'
3. A Schematic Design of Tonic and Phasic Reaction Systems
4. Posture-Regulating Lower Centres of the Brain
5. Uḍḍiyāna and Nauli (A Kymographic Record of Pressure Changes)
6. Stages in Prāṇāyāma
7. Yoga-Danḍa Effect (A Kymographic Record)
8. Regulation of Respiratory Centre
9. The Old and the New (Accessories used in some of the Yogic Practices)
10. Gajakaraṇi (A Kymographic Record)
11. E E G during Deep Dhyāna State

APPENDIX 'A' ILLUSTRATIONS

Figure

- 1 Padmāsana
- 2 Siddhāsana
- 3 Bhujāṅgāsana
- 4 Śalabhāsana
- 4(a) Ardha-Śalabhāsana
- 5 Dhanurāsana
- 6 Halāsana
- 7 Paścimatāna
- 8 Ardha-Matsyendrāsana
- 9 Mayūrāsana
- 10 Śavāsana
- 11 Viparīta-Karaṇi
- 12 Sarvāṅgāsana
- 12(a) Matsyāsana
- 13 Śirṣāsana
- 14 Yoga Mudrā
- 15 Uḍḍiyāna (in sitting)
- 16 Madhyamā Nauli
- 16(a) Dakṣiṇā Nauli
- 16(b) Vāma Nauli

Fig. 1



YOGA—VĪṆA

‘Yoga is Harmony’

A Vīṇā gives exquisite heavenly music only when its strings are attuned adequately and played upon harmoniously. One of the principal meanings of Yoga is ‘Saṅgati’—harmony. Joy of positive health depends upon harmony between all bodily and mental functions (*vide* page 35).

INTRODUCTION

Really speaking, therapy is not a field of Yoga in its proper sense. Even so, Yoga has necessarily to do with health activities. How these two are related, and in what way, we shall try to see in the following pages.

The term 'Yoga' is used to indicate both the 'End' as well as the 'Means'. In the sense of the 'End', the word Yoga signifies 'Integration', at its highest level. All the means that subscribe to help reach this goal also constitute Yoga,—in the sense of 'Yukti', the means or technique. All the practices, whether high or low, that are calculated to help the progress of the aspirant towards such an integration are *together* known by the name 'Yoga'. Yoga is thus an integral subject which takes into consideration man *as a whole*. It does not divide him into water-tight compartments as body, mind, spirit, etc.

As a process of integration, it has necessarily to find ways and means to counteract the influences that are likely to contribute to any sort of 'disintegration'. Ill health of mind and body is one such. A healthy mind and healthy body are, in fact, considered as essential pre-requisites to the higher practices of Yoga. To ensure the health of body and mind, Yoga Śāstra (the Science of Yoga) has laid down certain *positive* hygienic methods, both of mental as well as physical hygiene. These constitute what is known as Kriyā Yoga in Yogic parlance. It is considered essential that every Yogic aspirant who has not attained at balance state (true health) of body and mind must first go through a course of Kriyā Yoga before he starts the higher practices of Yoga proper. The aspirant is warned that unless he does this, he is likely to meet with great many pitfalls in his path, and may even become a physical or mental wreck. Cases are not lacking of those that have suffered thus owing to their rash undertaking of the higher practices of Yoga without preparing their body and mind for them, as laid down in Yoga Śāstra.

The word 'Kriyā' or 'Karma' (literally, action) has got a technical sense in Yoga. It means a purificatory and reconditioning process. Even in the Gītā, the term Karma Yoga seems to signify the same. There appears to be a pun on the word Karma. It is meant to show that the ordinary duties of life and one's normal actions could contribute to a purification of mind, provided one changed one's attitude towards them. In Ayurveda, too, the word 'Karma' is used in this same technical sense, *i.e.*, 'Śodhana Karma'—cleansing process—as can be gauged from the well-known branch of the Ayurvedic treatment called 'Panca-Karma-Cikitsā'. Though, in Yoga too, the word 'Kriyā' or 'Karma' is used specifically for its various cleansing processes, *i.e.*, lavages with water, air, etc., the word Kriyā Yoga, as such, signifies a preparatory stage as a whole which envisages a complete reconditioning of both mind and body, so as immensely widen the range of their adaptability, as also raise the threshold of the re-activity.

Perhaps it would be better to make this more explicit. In Kriyā Yoga, due consideration is given to the environmental influences, both external and internal, on the physical as well as mental processes. The attempt is to cultivate a sort of strong immunity which is capable of offering an effective resistance to the various impingements on body and mind, both from within and without. Such a fortification of body and mind is considered highly essential to bring about a balanced behaviour and stable personality which every true Yoga aims at.

It is now being recognised that positive health and feeling of well-being both have their levels and degrees, though these cannot be defined to-day in exact terms. Kriyā Yoga is meant to raise this level of health and feeling of well-being to the highest degree possible. In order to obtain the same, certain principles are laid down regarding diet, residence, and conscious cultivation of helpful and healthy *positive attitude* towards social and personal surroundings. The idea is to create a congenial atmosphere during the period of training for higher Yoga. This achieved, certain hygienic psychophysical exercises are prescribed to recondition the body and mind. In case the system is highly clogged with waste material, certain accessory lavages (Kriyās) are specifically advocated. All these are aimed at bringing about an equilibrium not only of all the systems of the body, but also between body and mind. Thus, any training of Kriyā Yoga proper submits a person to a way of life which is conducive to the organization of his psychosomatic personality in such a manner as to develop within him a capacity to withstand a considerably wide range of environmental variations, without initiating any disorder in the process of his reactions. This seems to be achieved by bringing about an altered adaptability of the tissues forming the various systems and organs, which would not readily undergo any functional disorder or pathological changes when exposed to trauma.

Autonomic and proprioceptive neuro-muscular reactions seems to have an important bearing in bringing about these results, along with certain changes in the secretions of endocrinal glands. But the stress laid on regulation of diet, respiration and cultivation of positive attitudes goes to show that the aim is primarily to bring about a beneficial change in the metabolism of the body as a whole. These metabolic changes, through the body fluids, may act on different systems, such as glandular, circulatory, nervous, excretory, etc., and bring about a complete change in the total personality of the individual, before he takes to the higher practices of Yoga. Thus, Yogic Therapy does not consist of mere lavages and exercise treatment but lays great stress on control of diet, social attitudes and personal habits so as to bring about beneficial changes in the whole of the metabolic process. It is truly an integrated approach, treating man as a whole, and, as such, should be expected to yield better results than any other system which tends to give predominance to a single manifestation of disease, ignoring the other less manifest concomitant changes, which are as important as the overt ones.

CHAPTER I

CONCEPT OF DISEASE IN YOGA AND PRINCIPLES OF YOGIC TREATMENT

Yoga is generally supposed to deal with only the mind and spirit. But a diligent reading of the Yoga Sūtras (aphorisms) of Patañjali will convince any one that they treat the body and mind as a whole. Hence they include certain 'physical' exercises like Asānas and Prāṇāyāmas, as a prelude to the higher psychological practices. All these, as claimed by the Sūtras themselves, aim at bringing about an integration in the psycho-physiological processes as a first step towards the attainment, according to Patañjali, of '*samādhi*', ("*Samādhibhāvanārthaḥ*"—P.Y.S. II—2). These practices are intended to stabilize the psycho-physiological mechanism so that there is less and less tendency towards an imbalance in the face of external and internal stimuli. Yoga thus does not divide the body and mind into water-tight compartments but recognises the close inter-relationship between the two.

The yogic concept of the working of body and mind is that there is a homeostatic mechanism in both, which contributes to a balanced, integrated functioning ('*samādhi*') even in the face of normal, external and internal stimuli, ('*kleśa*'s), i.e., that every person has an inherent power of adaptation. At the same time, though the tendency of body and mind is to obtain a functional balance, every irritation or stimulus, from without or within (be it mechanical, chemical, electrical, biological or psychological), does bring about a certain amount of psycho-physiological disturbance ('*vikṣepa*'). How long this '*vikṣepa*' will last will depend upon the relative strength of the stimuli, on the one hand, and the homeostatic ability of the body and mind, on the other. It is the aim of Yoga (in the sense of 'means'—'*yukti*') to devise ways and means to help the body and mind maintain their state of balance, or regain it quickly if lost, in the face of such disturbing factors.

'*Vyādhi*'—disease—is considered as one such psycho-physiological disturbance or '*vikṣepa*' (Vide P.Y.S. I—30). We have already pointed out that the word 'Yoga', as the 'end', signifies 'integration' or '*samādhi*' (from *sam*+*ā*+*dhā*—to put together as one whole); '*vyādhi*' (from *vi*+*ā*+*dhā*—to put out, to disconcert) is opposite of this, i.e., dis-integration; it contributes to a feeling of being 'ill' at ease ('*dukkha*') and hence it is a 'dis-ease'-producing process. It is, therefore, a '*vikṣepa*'.

An acute disease, though it indicates a failure on the part of body to meet the offending factor adequately, still indicates that the body is putting up a successful 'fight' to eradicate or neutralise the disturbing element. It is thus only a temporary disturbance, and, as such, in the view of Yoga, it is better to leave the body alone. The body could take care of itself. What one could best do is to help the body

YOGIC THERAPY

in its fight by not taxing it with further work. Thus, to an extent, Yoga would seem to agree with modern 'naturo-pathy' but it is not against resorting to any specific method of eradication of the offending factors, provided one knew how to do so, without harming the body or mind. A thorn, for example, that pricks and disturbs the 'equilibrium', is better out and not left to Nature to be dealt with. So too, if one knew the exact agent or agents that were responsible for a disturbance, and also knew how to eradicate the same, without disturbing, for long, the normal functioning of the body itself, then and then only was one justified in resorting to such methods. Yoga is not opposed to such a proper and judicious treatment of acute diseases, as is generally supposed. In fact, most of the Yogins have been found to use herbal and Ayurvedic remedies for such purposes and are found to keep a good stock of them to help themselves and others in case of need.

It is a different story, however, with sub-acute and chronic disorders. These fall in a different category. They indicate that the body is failing in its fight and is inadequately equipped. A chronic disease process is a sign of some mal-adjustments or faults in our forces of adaptation. According to Yoga, these mostly consist of : (1) a faulty circulation of blood and lymph, leading to chronic congestions and stagnation of waste products in certain regions, which have a toxic effect on the body as a whole; and (2) a faulty system of neuro-muscular and neuro-glandular reactions.

These two, *i.e.*, chronic congestions and faulty neuro-musculo-glandular reactions are interdependent. Thus, a disturbance in the vasomotor control would throw off the gear the rhythm of vasodilatation and vasoconstriction and would give rise to circulatory disturbances. general or localised when the nerves, muscles and glands are deprived of a good blood supply, they too would fail in reacting adequately and thus a vicious circle would ensue. each disturbance contributing to the other. So, if one were to set the process right, one had to find out the causes that lead to these two faults. They may be due to one or more of the following: bad postural and other habits, deficiencies or lack of proper control in diet, or certain psychological disturbances. *i.e.*, conflicts within. It is best to attend to all of these and see that they are all set right. According to Yoga, which looks upon man as 'a whole', a mere exercise treatment, or just a change in diet or psychological attitude, though it may afford some relief, does not constitute a complete rational treatment for a person.

Acute diseases, too, generally leave some effect on the body and mind, though there may not be any apparent sign of the mischief done. They leave behind some imbalances, which, many a time, it takes the body long to overcome, and at times, even make it nearly impossible for the body to recover completely. It is the duty of the attending physician not to leave the patient to his fate, the

CONCEPT OF DISEASE IN YOGA AND PRINCIPLES OF YOGIC TREATMENT

moment he is 'on his feet', but advise him some adequate methods of rehabilitation to be practised for a length of time, depending upon the nature of the disease process and the damage suffered by him. A person can be said to be 'cured' only when he is entirely free from the vestiges of the disease-process. It is a pity that, in the busy routine work-a-day-world of today, these rehabilitative procedures are rarely adopted, with the result that the person, though apparently healthy and moving about, is not at all capable of meeting adequately the many stresses of life. This renders him easily prone to either other acute attacks, off and on, or to some chronic disorder. Very few people could claim to be completely 'proof' to attacks of acute diseases. Yoga, therefore, recommends the practice of at least some of its procedures to keep oneself 'positively' healthy and 'buoyant'.

In the treatment of diseases, there are two ways of looking at things: one is to investigate the offending factor and help its eradication and leave the body to recoup itself, once it is freed from the hands of 'marauders'; another is to help the body itself to put up a brave and successful fight against the offenders and come out victorious by dint of its own efforts. The body has its own inherent powers of developing specific immunity and has also a general capacity of resisting the onslaughts of offending factors successfully.

Since the discovery of 'microbes' and the part they play in the causation of disease, orthodox medicine has concentrated mostly on the first procedure. It is not that it is ignorant of the second, but, in practice, much less attention is generally given to it by an average medical practitioner. After the treatment of an acute disease, patients are generally left to their own fate. At the most, some vitamin tablets or a general 'tonic' is recommended. The net result is that the body, with weakened and inefficient organs to cope with, is left still exposed to the ravages of the disease. Of course, this new thought of taking care of every patient even after he is rendered free from acute attacks is slowly gaining ground and is being accepted more and more in the medical world, especially in the field of physical medicine. Still, as matters stand at present, physical medicine is more occupied with the problem of rehabilitation of the physically disabled, especially with locomotor disabilities, than with rehabilitation of those that suffer from functional disorders, as a result of either repeated acute attacks or other maladjustments.

The attitude of Yoga towards the problem of disease, as towards everything else, is that one has to fortify one's own self rather than waste time in eradicating this or that particular offending factor. The simile that is given is that of a forest full of thorns. If one were to go through such a forest, it would be foolish to remove the thorns one by one, and then move forward! It would be wiser and easier to wear a pair of good shoes to protect one's feet! "For a man who wears the shoe, the whole earth would indeed seem as if covered with soft leather", (*upānād-gūḍha-pādasya nanu carmāstrītaiva bhūh*.---Yoga Vāsiṣṭha). One of the

YOGIC THERAPY

meanings of the word 'Yoga' itself is "*sannahana*",—to be armoured or well-prepared. Thus, Yoga lays a great stress strengthening the inherent defensive mechanisms of the body and mind rather than attacking and eradicating individual offending factors. In the treatment of diseases, too, its eye is on the development of the inner natural powers of the body and mind to help them gain homeostatic balance. In doing so, it gives special attention to the various eliminative processes and the processes of reconditioning that are inherent in the body, *i.e.*, developing one's powers of adaptation and adjustment. This, in Yogic parlance, (especially that of Haṭha Yoga), is known as '*nāḍi śuddhi*': purification of all channels,—of circulation and communication. '*nāḍi*', in Yoga, primarily means a nerve, but the word is also used to mean any tubular structure, *e.g.*, '*śaktināḍi*': large intestines, and sometimes, any channel of communication. '*mala-śuddhi*'—eradication of '*malas*'—is another name given to the same process. '*mala*'—in Yoga means any factor that disturbs the balanced working of the body and mind.

One of the aims of Yoga is to encourage positive hygiene and health. Positive health does not mean merely freedom from disease, but a jubilant and energetic feeling of well being with an amount of general resistance and capacity to easily cultivate an immunity against specific offending agents. It does not mean merely an ability to work *somehow* but a capacity which does not allow a person to be slothy or lazy. '*Styāna*' and '*ālasya*',—sloth and laziness,—are considered '*vikśepas*' in Yoga. They are a sign of ill-health, an imbalance whether on the physical or psychological level, and must be dealt with seriously. Unfortunately such a strict view about positive health is rarely held in modern orthodox systems of medicine. Hygiene and its methods, today, are mostly concerned with problems of sanitation, prevention of disease by eradication of disease agents through various insecticides, etc., prevention of pollution of air and water, care of food, general cleanliness, development of specific immunity through vaccine and sera, etc. These are all highly necessary from the point of public health measures, but, with all due deference to the good intentions of modern medicine, it may be pointed out that they are all 'negative measures'. While they do prevent the spread of certain diseases, they also render the individual more and more delicate and incapable of 'standing on his own legs' and actively fighting a disease process, depending on his own inherent powers and capacities. As it is, it seems the modern man is being gradually deprived of his *internal* capacity to fight his own battles, and is being made to lean more and more on *external* measures to save him from such disturbing factors. The net result is that the body does not at all 'learn' to meet the 'offenders' and, if caught unawares, finds itself incapable of fighting them. It is a law of Nature that whatever is thrown into disuse slowly atrophies and ultimately disappears. Man in his attempts to get more and more 'comforts' has been gradually depriving himself of the natural rugged resistance and health of his forefathers.

In the 'Great War' that is being waged between man and microbes today, it seems that while man has been winning battles, he is losing the war ! It is

known that microbes have been evolving strains that are stronger and more highly resistant to the new chemicals and drugs invented or discovered by man. So much so that man has to change his method of attack every few years. It is perhaps too early to say who will win this war. So far, man is having apparently an upper hand by bringing in new weapons. While all this is going on, on the one side, man himself is losing his powers of inner resistance for reasons mentioned above, on the other. In addition to it, the growing industrialisation of today, and the rapid changes in social structure, etc., force him to meet with much more complex situations than his forefathers had to, and he seems to be rather unprepared for them.

It is well-known that though, with better public health measures, infective diseases are on a decrease, there has been a rise in metabolic and psychosomatic disorders. All these are chronic disorders of adaptation. Science seems to be groping about for some external help in the form of substitution therapies, tranquillisers, etc., but it is being appreciated more and more that the approach should be from the other end, *i.e.*, the internal systems of man have to be trained to cope with the new situations and circumstances. In other words, man has to be so trained as to be able to cultivate his own powers of adaptation and adjustment.

The foregoing paragraphs have been written not with the intention of deprecating the value of public health measures but only to show another aspect of their results. Along with the eradication of deleterious agents from *external* environment of man, it is high time that hygiene gave more and more attention also to methods of cultivation, and widening the range, of these inherent powers of adaptation and adjustment that are inherent in the *internal* environment of man so as to help him enjoy *positive* health and not just freedom from disease. Yoga, it must be pointed out, lays great stress on this aspect. It does so through three integral steps, (1) cultivation of correct psychological attitudes, (2) reconditioning of the neuro-muscular and neuro-glandular systems,—in fact, the whole body—to enable it to withstand greater stress and strain, and at the same time, (3) laying great emphasis on health-giving diet, and encouraging the natural processes of elimination, whenever it is necessary, by resorting to special lavages and baths. These constitute the three general measures of Yogic Therapy.

There are also some specific measures advocated by Yoga to meet the requirements of particular systems. This brochure will only outline the principles of the general procedures followed in Yoga therapy and explain their rationale. A separate chapter will deal with the limitations of the therapy, the special fields where it can be more helpful, and its indications and contra-indications.

CHAPTER II

CULTIVATION OF CORRECT PSYCHOLOGICAL ATTITUDES

Cultivation of correct psychological attitudes is of high significance in Yogic Therapy. One's attitude towards things in general, and towards one's circumstances of life in particular, according to Yoga, have an important bearing, direct or indirect, on the genesis of not only psychosomatic and chronic,—metabolic and other,—disorders, but also of infectious ones. In this chapter, we propose to deal with the *raison d'être* behind this argument, and how Yoga proceeds to help one change one's attitudes.

It has already been pointed out in the previous chapter that the approach of Yoga towards the problem of disease is an integral one. It does not view man as consisting of so many unrelated parts but takes him to be one whole, nay, to be more correct, as an integral part of a larger whole,—the cosmos! It is not that modern medicine is blind to this, but in treatment and practice, it seems to be somehow preoccupied with an outlook of specificity in diseases; thus, pneumonia, for example, is considered mostly to be a disease of the lungs proper, and not a disease of the body as a whole, and attention and efforts are concentrated on and directed to, that organ in the main. It is assumed that the reactions of the body which constitute the disease process are due to the affection of the lungs,—an attack by certain organisms on that part,—and that once that part is rendered free from the attack, the general reactive processes will stop automatically and the patient will find a 'cure'! It is contended that this 'curative process' is inherent in every living being; what medicine has to do is only to help the person to repulse the particular attack, to destroy or neutralise the offending factors. There is nothing irrational in this. In fact, medicine has succeeded in making an immense progress in affording 'relief' to humanity through this approach. But, as is well-known to every doctor, no *ideal* drug or method has so far been discovered in science which would destroy or neutralise the offending factors alone but would not harm the normal tissues. No wonder then that, after the so-called cure, the person is left more debilitated and handicapped and with much less of his own inherent powers of resistance and immunity.

To use a metaphor, it is like a big house with so many people and servants, themselves, capable of fighting and warding off external attacks, but calling for outside help and getting jittery, when attacked by some marauders, and the gendarmes, being unable to distinguish between the 'friends' and 'foes', the mischief-makers and the members of the household, resorting to indiscriminate firing and killing a few on both sides! The result is that all is 'quiet' when the gendarmes leave, but the house is left sans a good portion of its own defence force. It is true that attempts of modern medicine are to make this 'firing' as discriminate

CULTIVATION OF CORRECT PSYCHOLOGICAL ATTITUDES

and controlled as possible, and some measure of success has been achieved in this. But still it has not yet been able to find such 'ideal' drugs.

Many a time, however, the house is thrown into disorder because of some *internal* mismanagement, due to certain deficiencies and inefficiency in, or lack of proper co-ordination between, the various internal organs. Functional disorders belong mostly to this group. Deficiencies are filled by modern medicine by what is known as 'substitution therapy', supplying the want by giving an extra amount of articles required by the body (now-a-days these 'substitution' articles mostly consist of synthetic products), and at times, by prescribing a special and well regulated diet. But, efficiency of organs, and co-operation between them, *cannot* be brought about by mere ingestion of anything. They are to be set right by training the organs once again, directly or indirectly, and re-establishing a proper co-ordination and harmony between the various parts. This is now being recognised as the special field of physical medicine; but unfortunately, as said in the last chapter, physical medicine too seems to be thoroughly preoccupied with orthopaedic problems, *i.e.*, disabilities of locomotion.

Apart from the metabolic disorders, referred to above, there is another large group of diseases, not so well defined, which is included under 'psychosomatic' disorders, because it is found that though there is an element of somatic dysfunction in these disorders, there is also a good lot of psychological element, each one contributing to the other. Thus, modern medicine has come to accept that mind plays a significant role in, at least, a number of diseases.

Yoga seems to go a step further than this. According to it, mind has a very significant role to play not only in psychosomatic diseases, but also in every other form of disease, including the *acute* ones. Mind, when it is disturbed, may make the body prone to attacks by external organisms by lowering general resistance and also bring about an in-co-ordination between various organs thus lowering the efficiency of the body (and of itself). How this happens is explained by Yoga. Every psycho-physiological disturbance (*vikṣepa*), every emotion, especially a negative and destructive one, apart from causing distress and depression (*'dukkha'* and *'daurmanasya'*), also interfere with the tonic rhythm of muscles and vessels, *i.e.*, gives rise to *'angamejayatva'*, and to a disturbance of respiration (*'śvāsa-praśvāsa'*) (P.Y.S.I.-31). The disturbance of the tonic rhythm of muscles and vessels (*'angamejayatva'*), according to Yoga, proves to be practically a trigger for starting a chain of reactions; even the disturbance of respiratory rhythm is, in part, due to this *'angamejayatva'* only. How rational this concept is can be gauged when we visualise the physiological effects of this process. Any sudden increase in the tone of muscles is bound to make a higher demand on circulation, respiration, sugar metabolism and other metabolisms, to feed the muscles *better* to maintain the required tone. If along with this there is also a general constriction of blood vessels in a state of emotion, this will tax the heart and lungs all the more, as they will have to work against the resistance

YOGIC THERAPY

offered by the narrowed vessels. To meet these demands, the autonomic nervous system as well as the endocrinal system will be placed in a different gear, and there will be a higher adreno-sympathetic activity (Fig. 2). If the process is continued long enough, thyroid will also be stimulated to further action.

The chain of disturbances does not end here. The process not only affects the skeletal musculature but the body as a whole; thus, the contractile tissue that goes to form the various internal organs, intestines, heart, lungs, bronchioles, blood vessels, etc.,—is also affected by it, and this gives rise to a disturbance in the behaviour of internal organs as well, and changes the entire 'postural substrate' of the person. (We shall come to this again in the next chapter.) If the process goes on for a long time, *i.e.*, chronically, it may either give rise to congestion and stagnation, if the tone decreases and the tissues become sluggish, or to abnormal wear and tear, if the tone increases. This, along with disturbances in glandular secretions affecting all the body fluids, would make the body easily prone to attacks by foreign organisms, *i.e.*, to various infective diseases, or give rise to various chronic, functional and metabolic disorders.

Thus, '*angamejayatva*' seems to be rightly treated by Yoga as a general precursor of '*vyādhi*' or disease. In trying to go to the very root of the trouble, Yoga concentrates on efforts to prevent, as well as set right, this basic and primary factor.

There was a time when modern medicine looked upon a disease process in terms of individual organs, tissues and cells. Thus, as Drs Weiss and English²⁹ put it, "the view point of disease bequeathed to us from the nineteenth century could be indicated in the following formula :

Cellular disease—structural alterations—physiological (or functional) disturbance.

In the twentieth century, this formula underwent alteration in some situations. For example, in essential hypertension and vascular disease, the formula was altered to read :

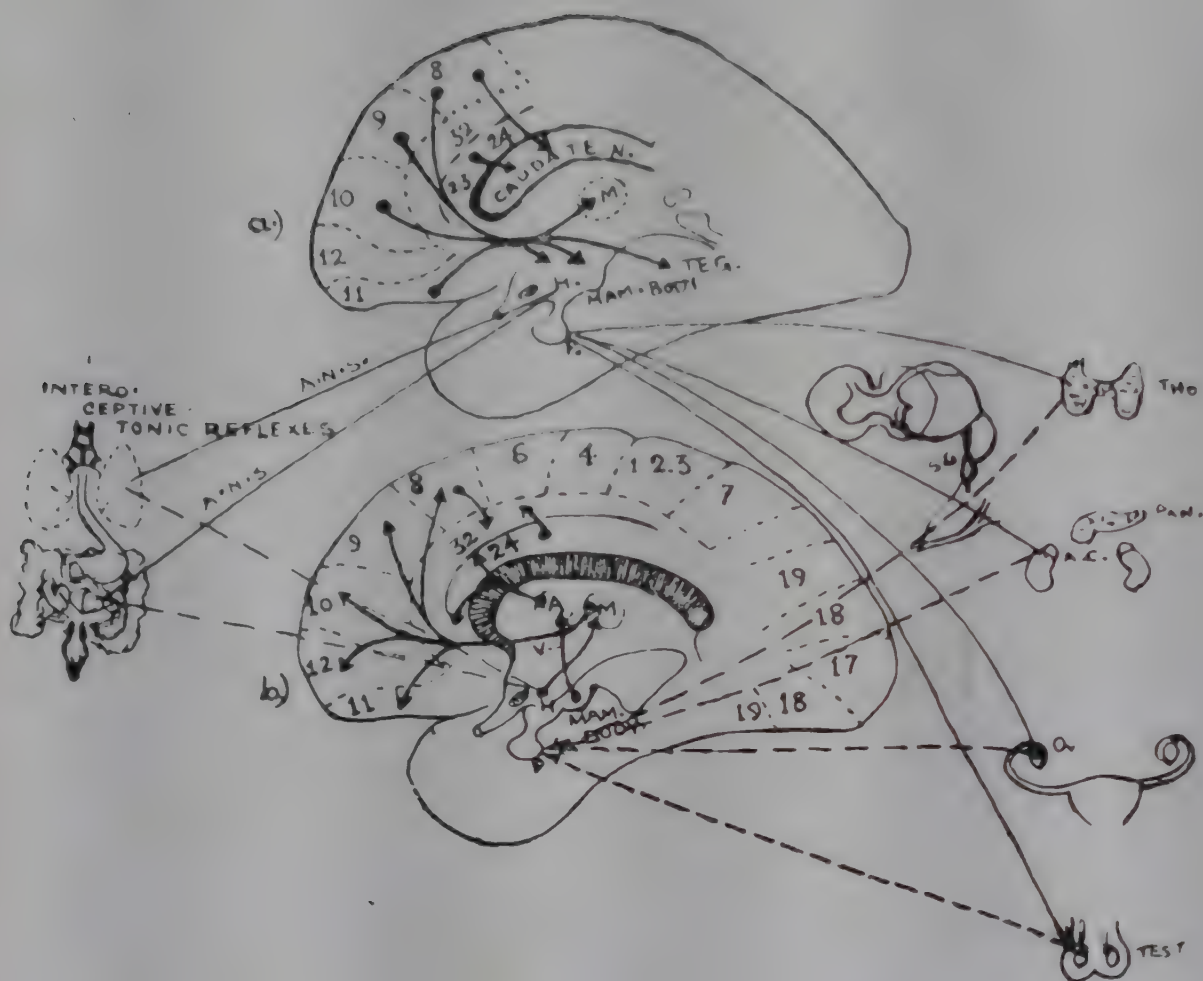
Functional disturbance—cellular disease—structural alteration."

The authors further remark, "We are still in the dark as to what may precede the functional disturbance, as in the example just cited, of essential hypertension and resulting vascular disease. It seems probable that future investigations will permit us to say that it is possible for a psychological disturbance to ante-date the functional alteration. Then the formula would read :

Psychological disturbance—functional impairment—cellular disease—structural alteration."

It is interesting to note that, ages ago, Yoga not only presented the same concept of disease but explained the psycho-physiological mechanism of the whole process and also suggested ways and means to set them right.

Fig. 2



A SCHEMATIC REPRESENTATION OF THE CHANNELS OF PSYCHO-PHYSIOLOGICAL INTER-RELATIONSHIP

(Main central scheme after Le Gros Clark)

(a) Efferent connections

A : Antr. Nucleus of Thalamus
M : Dorso-medial of Thalamus Nucleus
P : Pituitary
H : Hypothalamus
V : Mamillo-thalamic fibres of Vicq D'Azyr
MAM. BODY : Mamillary body
TEG. : Tegmentum

(b) Afferent connections

THD. : Thyroid
A.C. : Adreno-Cortex
PAN : Pancreas
OV. : Ovaries
TEST : Testes
A. N. S. : Autonomic Nervous System
S. G. : Sympathetic Ganglion

'Mind tells the body and the body tells the mind.'

Modern medicine seems inclined thus to agree with this ancient concept of Yoga. Its latest trends have been towards the recognition of a 'pathodynamics' of disease *in the whole body* rather than viewing disease in terms of the pathology of individual organs, tissues or cells. These latter are now-a-days being regarded as mere 'nodal points' in an incessant flux of bio-chemical and bio-physical processes involving of necessity all the body fluids. The part played by the mind in the deviations of such a flux is also receiving more and more attention these days. On the other side, advent of physical medicine has not only brought to light the special value of controlled and guided exercise in therapy, but recent work in that field has established the importance of the role played by tonic impulses in maintaining functional efficiency of not only the neuro-muscular mechanism but of practically the whole body, provided these are worked understandingly.

It is interesting to note that the ways and means suggested by Yoga are in line with these most modern findings. We shall come to these when we explain the significance of Āsanās, Mudrās and other Yogic exercises in prevention and treatment of diseases. This chapter we shall devote to the importance of cultivation of correct attitudes in Yogic prophylaxis and therapy.

It is well-known that all Yogas aim at tranquillization of mind, for, it is held, one can attain the true 'self' only when the mind is tranquil. A mind that is muddled with wandering thoughts, whether affective or non-affective, cannot be in a position to grasp the significance of the impersonal nature of 'Reality'. According to Yoga, mind and matter are both but manifestations of one and the same energy; they are but two aspects which we perceive as two operations of the one and the same eternal 'substance'. This 'perception' is, therefore, a relative process which is further distorted by the age-old accumulation of '*kleśa*'s, the prime '*kleśa*' being '*avidyā*'. Unless this latter too is done away with, one would not understand the 'True Law', '*ṛta*',—of the phenomenal world. It was Spinoza who said, "the better the mind understood its own forces and the order of nature the more easily would it be able to liberate itself from 'useless' things" (De Emendatione—p-230). The same is the contention of Yoga too. Some systems of Yoga try to achieve the tranquillization of mind through '*vāsanākṣaya*' or elimination of '*vāsanās*.' To this class may belong Jñāna, Bhakti, Karma and Dhyāna Yogas. Others try to achieve the same through the cessation of the prāṇik impulses ('*prāṇāspandana*'). To this class belong Mantra, Haṭha, Laya and Rāja Yogas. All these latter are termed Śakti-Yogas or Kuṇḍalinī Yogas, as they resort to the awakening of Kuṇḍalinī, a potential power that is supposed to lie dormant in everyone. Taken together, they have been traditionally known as 'Mahā Yoga' ("*mantro-haṭho-layo-rāja-yogāntā bhūmikāḥ kramāt, eka eva caturdhāyaṃ mahā yogo-bhidyate*"). Of course, these are not water-tight compartments. And, in actual practice, the adepts in Yoga are generally seen to resort to a combination of both to some extent.

Pātañjala Yoga, too, seems to aim at such a fair and judicious combination. It tackles the problem of tranquillization of mind from a psycho-physiological angle. Thus '*Kleśa's*', according to Patañjali, are neither purely psychological processes nor purely physiological ones. They are psycho-physiological mechanisms and, therefore, the best way to tackle them is to subject them to a bi-pronged attack of psycho-physiological type, at least until some mastery is gained over them. Hence it is that Patañjali advocates the initial practice of 'Yama's and 'Niyama's, on the one hand, and 'Asāna' and 'Prāṇāyāma', on the other. Once the hold of '*kleśa's*', on the mind was weakened through these processes of Kriyā Yoga, the later psychological methods of Dhyāna Yoga would bring about their elimination quite easily. '*Kleśa's*', according to Patañjali, are five—'*avidyā*' or misconception (about the nature of Reality), '*asmitā*' or 'I' persona affect, '*rāga*'—attachments, '*dveṣa*'—aversions, and '*abhiniveśa*'—false self projections. The '*kleśa's*' that were to be tackled initially were not '*avidyā*' or '*asmitā*' but '*rāga*' and '*dveṣa*'. These were like the so many branches of a full grown tree which were to be cut down first before felling the tree.

The best way to get rid of '*rāga*' and '*dveṣa*' is to find a 'middle path' between them, that is, to cultivate an aloofness of mind. It must be understood that '*vairāgya*' is not an aversion, as it is generally translated, but dispassion or disinterestedness. These '*rāga's*' and '*dveṣa's*', according to Yoga, are not directed by man only towards things outside but also towards himself. Otherwise, one would not be able to explain the rising incidence of suicides. Again, they are interfluent entities. The existence of one presupposes the existence of the other, *i.e.*, if we like a thing and want it badly, we will hate all things that thwart our desires and come in the way of our acquiring it. Not only so, but they may act against one and the same person or thing in an intermittent way, *i.e.*, one may love a person, and at the same time hate him. We may be conscious of both these feelings only if they are not sufficiently intense. But if they are intense enough, we may be only conscious of our predominant sentiment, but not of the other which may be repressed and lie dormant. This latter may express itself covertly, assuming a different guise. Rarely will it find an overt expression. And this is true also of one's attitude towards one's own self. This state of ambivalence is called in Yoga '*vicchināvasthā*' (intercepted state) of '*kleśa's*'. Again, these are not always reasoned processes, although they may be guided or controlled to some length by the reasons or intellect in an indirect way.

In the cultivation of attitudes, Yoga lays a great emphasis, as said above, on a conscious observance of certain rules for self-discipline and self-training called 'Yama's and 'Niyama's. Under 'Yama's come certain firm and solemn decisions to train and regulate one's behavioural attitude towards social problems, while 'Niyama's emphasize a cultivation of certain personal habits and attitudes. These are termed '*vrata's*'. The word '*vrata*' comes from the Samskrta root '*ṛt*',—to behave or function, with a nominative affix '*a*', showing a consciously

developed habit or attitude. It is generally translated as a 'vow', and perhaps that is the nearest word to it in English, taken in the sense of a 'solemn decision to behave' in a particular way. The aim of these '*vrata's*' is to help one to progressively cultivate '*vairāgya*' (dispassion) and '*viveka*' (discrimination). The idea behind this seems to be that, when not in actual grip of emotions, the cortex does have some control over most of the otherwise autonomic elements that are also within a certain range of volitional control. By a systematic mental approach that is backed by a rational conviction, it is possible to train the autonomic nervous system in such a way that, when the training is sufficiently advanced, the sensory impulses, however strong, will not be able to divert the mechanism *without first consulting the cortex*. There is nothing new in this. In fact, man has become a 'man' only through this process of conscious control of himself. What we call 'civilization' or 'culture' is a product of this procedure on the part of man. An animal mostly acts on an impulse. Its impulsive behaviour is only controlled by some other emotional impulse,—of fear, love, anger, etc. It is only man who (and perhaps some of the higher animals) uses imagination and judgment. And man through this process has trained himself through ages in such a way that he has overcome a good deal of his animal nature. But if we analyse the conduct of the average man today, we should find that even now he is not quite free from his impulsive behaviour. More than seventy-five per cent of his activity, whether in personal or public life, is governed by his innate uncontrolled impulses, many a time masked under a false guise of 'reasoning'. There are constructive as well as destructive (what in modern psychology are called positive and negative) elements in these impulsive patterns. Man's happiness and unhappiness depend upon his tactful control of these impulses. Most of the miseries of the world today, the many wars, conflicts, fights and factions, are an evidence that man has to go a long way in judiciously controlling these impulses. To use the Freudian language, the chief object of any psychotherapy is to increase the power of Ego and to decrease that of Id, *i.e.*, to increase the area of rational consciousness. Our intellect may not be able to overcome the inner ways at once, but persistence is sure to pay. This is called '*bhāvanā*' in Yoga, which means 'bringing back to mind consciously, again and again' (—"*cetasi punaḥ punaḥ niveśanam*") *i.e.*, persistent suggestions. Freud himself is seen to concur with such an attempt. Let us have him speak for himself¹². "We may insist as much as we like that human intellect is weak in comparison with human instincts, and be right in doing so. But nevertheless there is something peculiar about this weakness. The voice of the intellect is a soft one, but it does not rest until it has gained a hearing. Ultimately, after endlessly repeated rebuffs, it succeeds. This is one of the few points in which we may be optimistic about the future of man-kind. The primacy of the intellect lies in the far, but still probably not infinite distance." We have particularly brought in Freud's name here because a great many people misunderstand his attitude towards the instinctive impulses and treat every 'inhibition' as 'repression', forgetting that every educative process involves control and inhibi-

tions of certain impulses. It was only when Id was dominated by Super Ego,—both being subconscious or unconscious entities,—that repressions occurred, with their consequent psycho-physical complications. But the Ego could educate the mind, provided it itself (the Ego) was patient and persistent in its attempts. The former, the tussle between the Id and the Super Ego (in Freudian language) is called '*vicchinatā*' in Yoga—its literal meaning being 'intercepted activity', *i.e.*, intercepted as a result of conflict between two strong emotional urges [cf. (L) '*con+flugere*': to strike together and (S) '*vi+cchid*': to cut each other). This is the usual way things are 'controlled' (!) in the usual life of an average man, *i.e.*, when one emotional urge is much more powerful, it has an upper hand over the others that have no such 'drive' (*i.e.*, the particular '*kleśa*' is '*udāra*'—behaves freely). A conflict ('*vicchinatā*') occurs only when two emotional urges are equally strong and oppose each other, (—"*rūpātīśāyā vṛttyatīśāyāśca paraspāreṇa virudhyante, sāmānyāni tvatīśāyāḥ saha pravartante*"—Vyāsa on Pātañjala Yoga Sūtras, quoting Pancaśikhācārya). Such a conflict ('*vicchinatā*') creates internal 'tensions' ('*angamejayatva*') and these disturb the natural harmonious working of the body and mind as one whole unit. According to Yoga, these sustained internal tensions are a primary factor in lowering one's resistance and creating a disharmony in the various functions of the body. The measures that Yoga prescribes, to prevent as well as set them right, are 'Yama's and 'Niyama's, as psychological procedures, on one hand, and 'Āsāna's and 'Prāṇāyāma's, as physiological ones, on the other. In this chapter, we are concerning ourselves with the psychological procedures.

As said above, 'Yama's and 'Niyama's form the first '*vrata*'s to be taken up in Yoga,—what is called Kriyā Yoga or technique of purification and reconditioning. The aim of Kriyā Yoga is to help oneself to retain one's psycho-physiological balance as far as possible even in the face of strong external or internal stimuli. As stated already, 'Yama's contain certain rules for social conduct, while 'Niyama's are rules for personal (mental and physical) hygiene. Patañjali gives the following five as 'Yamas'—(1) '*ahimsā*' or abstention from any thoughts of hatred or wish to harm others, (2) '*satyaṃ*' or truthfulness, (3) '*asteyaṃ*' or abstention from any tendency to steal, (4) '*brahmacaryaṃ*' or control of sex activities, continence, (5) '*aparigrahaḥ*' or abstention from hoarding one's own or coveting others' wealth and possessions. Niyamas are (1) '*śaucaṃ*' or cleanliness and purity,—of mind and body, (2) '*śantoṣaḥ*' or contentment, (3) '*tapas*' or self-discipline, austerities (only such as would not affect one's health), (4) '*svādhyāyaḥ*' or engagement in study of such literature and/or in such other mental activities as would help self-realisation, and (5) '*īśvarapraṇidhānaṃ*' or surrender to God's will.

It would be better here to indicate how Yoga proceeds to help the aspirant cultivate these 'virtues',—these '*vrata*'s. These are not to be taken up as mere vows in a blind impulsive enthusiasm but accepted after due thought and con-

viction. A personal guide is supposed to help the aspirant in this. In his struggle for existence, man is generally torn between two conflicting tendencies, one,—to emerge out of his animal form of existence,—the progressive tendency and another,—to return to it again,—the regressive tendency. The history of the individual, and of the race, is nothing but a story of this ever lasting conflict. But man has become 'man' and retained his 'human' element only because the progressive tendency has always been the stronger, yet the frequent and widespread phenomena of mental illness and also the periodical wars and factions in the history of human race indicate that man is still waging an intense struggle, wherein he somehow regresses now and then to positions that he has apparently relinquished generations ago. As Erich Fromm puts it¹³ "man's life is determined by the inescapable alternative between regression and progression, between return to animal existence and arrival at human existence. Any attempt to return is painful, it inevitably leads to suffering and mental sickness to death either physiologically or mentally (insanity). Every step forward is frightening and painful too until a certain point is reached where fear and doubt have only minor proportions". It is this freedom from fear or '*abhaya*' that Yoga stresses as the goal, and the sole characteristic of men's true development. The Bhagavadgītā gives it the pride of place as the prime quality of '*daivi sampat*' or divine possessions. '*ahimsā*' is given the tenth place in the list. Erich Fromm, in his method of 'humanistic psychoanalysis' shows how man feels 'torn away from the primary union with nature which characterises animal existence. Having at the same time reason and imagination, he is aware of his aloneness and separateness; of his powerlessness and ignorance. He could face this state of being only if he could find new ties with his fellowmen which replace the old ones, regulated by instincts'. It is through some idealism that men try to overcome the outcome of their frustrations. By idealism Fromm means 'the striving for the satisfaction of needs which are specifically human and transcend the physiological needs of the organism'. One 'idealism' forms a good and adequate solution, another is bad and destructive one. Fromm delineates the several ways in which man seeks and achieves this 'union with his original existence'. In summary, they can be broadly classified under three headings: submission, domination and love. Submission may be to a person, group or institution,—or to God. Domination is trying to have power over a part of the world (his own surroundings, howsoever small) by making others 'a part of himself'. Both these, according to Fromm, are characteristics of the symbolic nature of relatedness. Though they satisfy the craving for closeness, they still suffer from lack of inner strength and self-reliance and are also threatened by conscious or un-conscious hostility. No amount of submission or domination is enough to give one the sense of identity or union and hence more and more is sought of the same (submission or domination) with the ultimate result of defeat and disintegration. *Love alone satisfies the need*, for while love is a union with somebody or something, it still retains 'the separateness and integrity of one's self'. In love there is an 'experience of sharing, of communion, which

permits full unfolding of one's own inner activity'. 'What matters is the particular *quality* of loving, not the object'. It has a 'productive orientation; the active and creative relatedness of man to his fellowman, to himself and to nature'.

For ages long, saints, prophets and philosophers have sung the virtues of love as the panacea for most of the world's ills. Buddha harped on it, the Rabbi of Nazareth said 'love thy neighbour as thyself'. But unfortunately, love cannot be created overnight, it has to be born. And hence it is that Yoga places '*ahimsa*' as the first rule of conduct which man can practise consciously, as the first step towards 'love'.

'*ahimsā*' is generally translated as 'non-violence'. '*himsā*' is not 'violence'; but a tendency to kill or harm, tendency to be violent. It is not an objective act but a subjective attitude. Many people are surprised that the same Gītā which advocates '*ahimsā*' also calls upon Arjuna to fight, to do a violent act! It must not be forgotten that the prophet who preached 'Love thy neighbour as thyself' and who advised to present the right cheek if one hit on the left, scourged the marketers near the synagogue with a whip for desecrating the house of his Father. Even Gandhiji told his followers that he would prefer them to die fighting than be cowards and flee. Mere objective 'non-violence' can be the result of fear, cowardice, or one's inability to retaliate, *i.e.*, where 'discretion is the better part of valour'. But this is not '*ahimsā*'; there is a constant inner chafing and resentment therein, which is '*himsā*'. In most of the chronic disorders, the authors have found this element of constant resentment fostered consciously or sub-consciously. No amount of treatment, not even the so-called Yogic treatment of Āsanas, Kriyās, Prāṇāyāmas, etc., is capable of yielding results in these cases so long as this inner resentment, lurks deep inside. Killing or violence without such resentment were far better than this. In Mahābhārata, there is the story of Tulādhāra, the butcher, to whom a sage was directed by his '*guru*', an ordinary housewife, to receive instructions from. A surgeon who operates, a butcher who kills, a scientist who sacrifices his animals,—all these do violence, but with this difference that there is no resentment or hatred, no desire to kill, and, as such, it is a lesser '*himsā*' than the '*ahimsā*' of the coward or frustrated man: we have to note this particularly, because it has a great bearing on Yogic Therapy.

Yamas and Niyamas are generally treated as so many religious or socio-ethical vows. Their psycho-physiological significance is rarely brought out even in the general so-called Yogic literature. Yoga is not concerned so much with social reform as with personal reform. To it, it was the man who formed the society; if man, the unit of society, was reorientated and rehabilitated properly, the society would reform automatically. The Yamas and Niyamas of Yoga were therefore not given as precepts of a mere moral code of behaviour but as practical instructions for attaining the highest degree of psychological health.

CULTIVATION OF CORRECT PSYCHOLOGICAL ATTITUDES

The attitude was rather that of an athletic trainer than of a moralist. The approach is quite in consonance with that of any practitioner of clinical psychology today.

The Haṭha Yogins seem to have approached the problem from a neuro-physiological angle. They looked upon it from the aspect of tonic reactions that are involved in a long-term variation in the determination of behaviour. The way how they tackled these reactions to set the whole process right was a bit different. Though the procedure was long and perhaps a tiresome one, it was, according to them, a safer and surer way. They conceded, however, that till it became effective, some safeguards had to be provided for. To this end, they seem to have insisted on the segregation of the 'sādhaka' (aspirant) from the society, initially. He was to resort, to a 'maṭha' or a cloister,—'far from the madding crowd'! And this cloister, again, was to be established in a place where there was a strong and benevolent reigning prince, where the people were religious and charitably minded, and where the atmosphere was pure and undisturbed, free from insects and other pests too. Even here, the 'sādhaka' was advised to remain alone, i.e., save himself from chance interpersonal clashes of interest. '*Surājye dhārmike deśe subhikṣye nirupadrave, ekānte mathikāmadhye sthātavyaṃ haṭhayoginā*' H.Y.P.—I-12. All these show how they cared for practically an emotional shut off to ensure maximum effects even in the field of primary physical practices of Yoga. Haṭha Yoga, thus, seems to have been intended for persons, who had practically 'given up the world'—at least for the time being.

Patañjali, however, seems to have taken into consideration the average man of society. To ensure a congenial atmosphere and frame of mind for the ensuing Yogic practices, Patañjali, or for the matter of that, the ancient Aṣṭāṅga Yoga, advocates the observance of these Yamas and Niyamas. Habits are thus to be consciously formed that would clear the way to the ultimate state of expanded consciousness aimed at in Yoga.

In advocating the method of the cultivation of such habits, Patañjali seems to differentiate between the effects of conscious emotional conflicts and unconscious ones. It is in the field of conscious emotional conflicts that Patañjali appears to advocate the observance of Yamas and Niyamas as a remedy. For the effects of unconscious or subconscious conflicts, he seems to recommend Āsanās and Prāṇāyāma. We shall deal with these in the next chapter.

In the modern set of things, these vows may seem rather crude and exacting. Some may even take them to be harmful to health—both mental and physical. Especially some members of the so-called 'Freudian' school may treat them as merely processes of inhibition, fraught with the greatest dangers. The observance of celibacy has particularly been the butt of criticism from both psychiatrists

YOGIC THERAPY

and medical men. Conflicting views are held by prominent authorities on the subject of continence and its results. While there are some who hold that the sex glands are impaired by long celibacy, there are many others who maintain that positive continence is quite compatible with health and that the sex glands are like the sweat and tear glands which do not atrophy with disuse. It is not our purpose here to enter into this controversy. We may state only the Yogic view. Yoga feels that the whole issue of sex is unnecessarily complicated by people by their subjective 'juggling with values, in a state of hormonal intoxication'. Nothing much may be said about the so-called attractiveness of body of the opposite sex. But even the most indifferent objects are found transformed by the mind into the most powerful sexual stimuli. Poets and artists by their suggestive techniques have added further zest to it. As Claude Bragdon put it in 'Yoga for you'⁵, "So overloaded are the sexual batteries in man, and so artificially stimulated, so intense is the Pleasure of coition, that he has broken the rhythm of nature, creating a condition of things different from any existing in the animal world, where there is no 'sexual problem'. With the advance of what goes by the name of civilization, that problem becomes with man increasingly acute. Abnormal emotional states caused by pride, fear, shame, frustration, together with the heightening of sexual allure, erotic books and plays, alcohol, rich food, etc., lead to excess of sexuality and abnormal sexual practices, masturbation, homosexuality, lesbianism, which, with their attendant secret shames—hypocrisies, jealousies and resentments have the effect of splitting the personality asunder, making impossible that unity of being necessary to a normal healthy and happy life. And Unity of Being, as I said in the very beginning and now repeat, is necessary for the practice of Yoga".

"Unlike the higher animals, man knows no periods of continence save those enforced by lack of opportunity. His excess sex potency, which, according to the ancient and secret teaching upon which Yoga is based, ought to be used for his own higher evolution, is used by him chiefly for self gratification. Because pregnancy and childbirth interfere with his indulgence in sexual pleasures, he has devised ingenious, chemical and mechanical means to prevent fertilization, making marriage a form of licensed prostitution, self-control, playing no part in birth control."

Yoga has called absolute continence a '*mahāvratā*', a great vow, which is only meant for those '*tīvrasmvegins*', the keen dispassionate enthusiasts, who have the requisite mental background for the same. For others, to quote Claude Bragdon again :

"Absolute continence is not recommended, because sexual desire, if rigorously curbed, will be diverted into other channels and become more dangerous than if naturally satisfied. The object is not to suppress sexuality, that creative fountain of life, but to subjugate and control it so as to direct it upward into the

marriage chamber of the brain. Therefore, extend the period between indulgences, avoid meat and alcohol, never think of sexual matters except during the act itself and when a lustful desire, idea or image enters the mind, put it away at once. Recognise that all impure thoughts are part of that subsidiary personality which presides over the sexual organs, intent alone on its own gratification, and trying in this way to coerce you. Determine to be master in your own house."

Marriage should lead to love and affection and not to licentiousness. It was contended by the ancients that there was more pleasure and happiness in the loving and affectionate exchanges between man and wife, the innocent and controlled love play, than in actual coition ("*mitho lilā-vilāsenā yatsukham dam-paterbhavet; na tathā sampravogena syādevam rasikā viduḥ*"). Such an affection and love would fill the hearts of the couple with a constant contentment and would pervade the whole family, while the pleasures of coition would lead only to a temporary satisfaction, but will not prevent, or be bereft of, resentments, suspicion and hatred at other times.

Again, it must be repeated that these vows are not mere high emotional resolves. They are to be taken not in a fit of emotion, but only after an intellectual conviction of their value and help in furthering one's own cherished end. Temptations there will be. Turbulent conflicts will arise now and then between intellectual convictions on one hand and emotional urges on the other. On such occasions, what Patañjali advocates is to take the wind out of the sails of such emotional drives by resorting to '*prati-pakṣabhāvanam*', i.e., persistently suggesting a third way out, a way of indifference—"'*vitarkabādhane pratipakṣabhāvanam*'" P.Y.S.—II-33. It need not be always a suggestion to the contrary, as some people interpret this aphorism to mean. One cannot at once make one's self love a person whom one is intensely inclined to hate. Still, as the great philosopher Spinoza points out, "Every hatred, perhaps because it trembles on the verge of love, can be more easily overcome by love than by hate, because hatred is fed on the feeling that it is being returned. Again to hate is really to admit one's own inferiority. None hates a foe that one is confident of overcoming! Hate conquered by love yields joyfully". Yet, after all is said and done, ordinarily no person can be expected to return love for hate or to convert a feeling of hatred into love overnight. Apart from the questionable amount of success, the very attempt would add to the strain. But though one may not be able to transform one's hatred into love, one can at least question oneself about the propriety of hating and whether it is in any way contributive to one's cherished high aims. The answer would naturally be in the negative. The temptation may, all the same, occur again and again. The best way to withstand it is by resorting to such self-questioning. And this is the way Vyāsa too interprets this aphorism. The relief obtained this way is often immense, for we are not wholly irrational.

YOGIC THERAPY

Freud may not have been very original in the formulation of his theory of two instincts, Eros and Thanatos, but it surely carried a new meaning when viewed against the background of his earlier writings. The first tremendous revelation of his was that all of us lived another life which was beyond our control. He showed how the unconscious impulses, the fears and desires hidden in the deep, dark recesses of man's mind, actually influenced and guided his conscious acts. He also showed how man consciously tried to rationalize his own acts and opinions which were really forced upon him and determined by the unconscious processes of his mind, how he meekly made his reason explain away and justify a conduct born out of unconscious drives. In this set, surely, the two instincts carry a new import.

Thus, Freud's findings help one to understand better the full implications of such terms as '*prasupta*' (dormant), '*vicchinna*' (intercepted), '*tanu*' (mild and ineffective), and '*udāra*' (free or unrestricted), as applied to '*kleśa*'s in Yoga, especially to '*raga*' and '*dveṣa*' (love and hate). It was recognised that the average man of the world ('*sāmsārika*') was capable of manifesting only two states of '*kleśa*'s, i.e., '*vicchinna*' (intercepted) and '*udāra*' (free). If there was no barrier, (physical or psychological) the '*kleśa*'s would find a free expression (*udāra*). It was held, however, by the early commentators of Pātañjala Sūtras that interception ('*vicchinna**natā*') was only due to a temporal factor of favourability. Thus, it was stated, if a man loved a particular woman, it did not mean that he was tired of another, but that, temporarily, his sentiments were finding a full expression in one case because of some favourable exciting factors; he might manifest the same sentiments towards the other woman too, under other favourable circumstances at a future date. Now, this seems to be a very tame explanation of '*vicchinna**natā*' or interception, and does not bring out the full import of the term '*kleśa*', the literal meaning of which is 'pain' or 'irritation'. If we understand, however, the Freudian concept of ambivalence and working of unresolved emotional conflicts in the subconscious field, we realise why these propensities were regarded as really painful (*kliṣṭa*) by our ancient sages. It was only in the Yogins that these '*kleśa*'s were weak and ineffective (*tanu*), because their edge was knocked off by long Yogic practices. They ceased, therefore, to trouble them but still they were there and had at least a nuisance value.

To eradicate the '*kleśa*'s fully, to be free from all such emotional effects completely, we must 'burn the seed'. This 'seed', according to Yoga, lies in the 'I' persona, '*asmitā*'. How the 'I' persona is responsible for the dichotomous processes has been shown by Dr. Burrow admirably in the "Neurosis of Man". We shall come to this in Chapter V.

The 'I' persona, however, has long ceased to be mere psychological problem; the habitual outlook of ages, as Dr. Burrow has explained, has fully fuddled the senses; the long continued persistence of this state has, already, made it an

CULTIVATION OF CORRECT PSYCHOLOGICAL ATTITUDES

organismic entity, a phylic structural pattern, a biological factor with a separate neural basis and a separate physiological substrate of its own. Unless that is tackled and set right, man's conflicts will go on incessantly.

As already indicated, Yoga has a bifold technique of tackling this problem on both the fronts—physical as well as psychological. The dilemma is squarely held by its horns. Naturally, the process of undoing what has been built up for ages will take a long time. As Vasiṣṭha has put it, “*janmāntaraśatābhyastā rāma sansārasansthitā; sā cirābhyāsayogena vinā na kṣiyate kvacit*”.—Oh, Rama, the habitual state of this worldly life, acquired through hundreds of lives past, can never be eliminated without a prolonged practice at undoing the same’ (Yoga-Vāsiṣṭha). The ancient Yogins, therefore, formulated a code of behaviour for the ‘*sādhakas*’ which would help to shield them from mental agitations as far as possible. The process is called ‘*cittaprasādana*’ (or clarification of the mind). Apart from Yamas and Niyamas, Yoga recommends another procedure, what is known as ‘*maitryādhāvanā*’ (persistent suggestions calculated to foster friendliness, etc.), ‘*maitryādhāvanā*’ requires us to avoid jealousy, contempt, envy and anger,—all destructive feelings. We are to try to purposely cultivate a feeling of friendliness (‘*maitrī*’) towards those we feel jealous of, a feeling of empathy and compassion (‘*karuṇā*’) towards those whom we are inclined to hold in contempt, a feeling of joy and pleasure (‘*muditā*’) in company of those whom we would otherwise like to envy, (all these attitudes could perhaps be covered by one word,—‘fellow-feeling’), and finally, there perhaps will be those who cannot be tolerated at all because of their very vicious and irritating nature, towards whom one is to cultivate a feeling of indifference (‘*upekṣā*’) and avoid their company altogether.

Though no marvellous results in personality changes could be expected with these without there being a proportionate change in the physiological substrate, yet, after all is said and done, it is also true that no physical exercise would contribute to harmony when carried out in a state of emotional agitation. So, an attempt has to be made to calm the mind, and keep it so by trying to cultivate certain mental attitudes in life. At least, the conscious elements of emotional conflicts could be controlled and gradually prevented by persistent efforts at the same. It is one of the first tenets of Yoga that behaviour helps the development of the structural pattern as much as the structural pattern directs the behaviour processes. Nay, the influence of mind over body is perhaps much more than that of the body over the mind. It is hence that Yoga lays a special emphasis on cultivation of correct psychological attitudes.

CHAPTER III

RECONDITIONING OF PSYCHO-PHYSIOLOGICAL MECHANISM

In the previous chapter it was shown how Yoga regards '*angamejayatva*', or disturbance of the tone of body, as the main trigger that gives rise to a process of chain reactions and thus lowers the resistance of the body as a whole, and also throws it into dysfunctioning. It was also shown how Yoga resorts to a bipronged technique to tackle this problem on both the fronts, physical as well as psychological. The psychological side was delineated in the previous chapter. In this chapter, we intend to describe the physical one. The conscious mental conflicts were to be tackled with Yamas, Niyamas, and '*maitryādibhāvanā*', and thus the growing tensions avoided. But what about the tensions already created and those that are being created by conflicts at an unconscious level? Since the cause is in the unconscious region, it would naturally take a long time to overcome it. How then could one prevent their ravages on the body and mind? This problem Yoga tries to tackle in the longer run by the process of Dhyāna, but, in the meanwhile, it also attempts to deal with the problem by working upon what, in modern physiological psychology, is called the 'postural substrate'. The term 'postural substrate' is used to indicate that aspect of tonic activity that is involved in any long term variation in the general level of bodily excitation. Such a postural substrate signifies an all-inclusive organic (neuro-glandular-muscular) background which influences every momentary performance. It consists of a vast array of processes, most of which are yet only vaguely understood. The most well-known of these are the processes of skeletal muscle tension; next to these, but less thoroughly understood, are the continued visceral tensions and abnormal glandular secretions. The specific tension emerging out of them all provides a continuous similarity of background for the general character of a person's behaviour, *i.e.*, all his phasic reactions, whether internal or external.

Normally, the postural substrate is relatively in a fluid state and can be patterned in a number of ways. However, if it is disintegrated through any continued stress, like a progressive disease or prolonged mental pressure, the individual will gradually become rigid and rather stereotyped in his response to stimuli. At times, as Dr. Freeman states in his book, '*Physiological Psychology*'¹⁰, the substrate may become even permanently fixated, especially "when some persistent motivational excitant is thwarted from attaining an adequate overt discharge". Such a type of postural fixation, as pointed out by Dr. Freeman, "helps to explain the loss of contact with reality of many psychotic patients". Thus, postural substrate has a great significance as determinant of behaviour, both external and internal (organic) one. When an individual in such a case gets firmly set on a speci-

RECONDITIONING OF PSYCHO-PHYSIOLOGICAL MECHANISM

fic course, the 'interoceptive-tonic' patterns dominate in a stereotyped way and the 'exteroceptive-phasic' influences have little effect. No amount of persuasion therefore will change the outlook of the person on life.

We shall presently explain what is meant by 'interoceptive-tonic' reactions and 'exteroceptive-phasic' ones.

Our neuro-muscular mechanism, as is well known, is of a dual nature, *i.e.*, it is capable of reacting in two ways, phasically and tonically. The phasic reactions are the one that contribute to movement and hence they catch the eye more easily than the tonic reactions, but actually these latter form the basic ground on which the former devolve. Since the tonic reactions are related mostly to postures, they are often termed 'Postural Reactions', but this is not a happy expression, for there are many other static reactions involved in the regulation of postures. The phasic reactions are quick and localised. They just come and go. They represent only a temporary readjustment to a momentary type of stimulus displacement. The tonic responses, on the other hand, are more enduring and diffuse types of adjustment calculated to maintain a certain continuity in the organism's conduct, by serving as a 'substratum' for the phasic reactions. Whether these two are mutually exclusive types of reactions or whether they are but extreme phases of one continuous scale has not yet been fully determined. But that they are two distinct reactions is admitted, each with its own receptor, adjustor and effector units, the last being common to both in some ways.

While the great pyramidal system dominates over the phasic reactions, the extrapyramidal system prevails over the tonic ones. We already know about the role played by such structures as the cerebellum, the tegmentum, the thalamus and the corpus striatum in the distribution of tonus. They play a similar part in the regulation of postural reflexes.

The receptors involved in the two types of reactions are also different, as pointed out by Sherrington, Bonnier and others. These are classed according to their anatomical location and origin of stimulus. Broadly, they are divided into (1) Exteroceptors and (2) Interoceptors. Exteroceptors are parts of the body surface and receive stimuli from the external environment. They include sensory end-organs of the eye, the ear, the nose, the mouth and the skin. Interoceptors, on the other hand, are embedded in the deeper tissues of the body and receive stimuli from the activities of these tissues themselves, *i.e.*, the internal environment. These include the sensory end-organs lying in the muscles, tendons, joints, the visceral organs and semi-circular canals.* Each receptor and effector field

*The organs of eye, ear and nose are sometimes called 'telereceptors', for instance receptors and the term 'exteroceptors' is reserved for the sensory end-organs of the skin only. So also 'proprioceptors' is the name given to the sensory end-organs of muscles, tendons and the labyrinth. The term 'interoceptors' is reserved by some for only the sensory end-organs of the viscera. It is better, however, and more convenient, to stick to the former broad classifications. We have given this distinction here, as we may have occasions to refer to 'proprioceptors' and 'proprioception'.

tends to be separately localised in the brain and each field is surrounded by what is termed an 'association area'.

Normally, while the exteroceptors excite phasic reactions, the interoceptors give rise to tonic ones. The way how these two mutually influence the specific patterns of response is very significant. The tonic interoceptive adjustment precedes the phasic one and also helps to sustain the same. The impulses from exteroceptors, in fact, produce their effect upon the motor units that are already under the influence of interoceptive impulses, emanating from the associated muscles. The interoceptor fibres are in intimate contact with the moto-neurons that innervate the muscles. Hence, if we were to talk of 'muscle-behaviour', only those phasic exteroceptive impulses would cause an overt response, which fit in with the prevalent pattern of the covert proprioceptive influences, in the matter of timing, phase and direction. That is, the final effect would vary according to the background afforded by the tonic impulses.

The exteroceptive impulses are, no doubt, stronger and more nearly simultaneous than the interoceptive ones, and hence they do succeed in arousing a 'full discharge', howsoever momentary, in the field of moto-neurons, but this cannot happen without the aid of interoceptors. Thus, if a muscle were to lose its tone, these exteroceptive impulses will cause little or no response. The analogy that is usually given, to explain this more clearly, is that of a rubber band which, when stretched slightly, responds vigorously to any pressure, but, when it is not taut, offers little resistance to the same.

The interoceptive impulses do more than merely sustain the exteroceptive ones. They also restrain them and determine their effectiveness. Thus, if the muscles were dominated by inhibitory rather than by excitatory interoceptive impulses, no response would be evoked by exteroceptive impulses.

In reactions that are integrated at the level of medulla oblongata, this influence of interoceptors upon the phasic reactions is seen even more clearly. Heart beats and respiration are primarily regulated by this interoceptive tonic system. The exteroceptive impulses influence these vital activities within only a very limited field. Thus, a sudden splash of cold water on one's face may stop the breath for a while, but only momentarily. The same is the case with response to pain. If pain is expected, the exteroceptive impulses meet with a different set of neural apparatus than when it is not expected. The typical 'startle' will not be there.

However, the two systems are not to be regarded as mutually distinct entities. They both form parts of a total unitary reaction. Any cross-section of behaviour will consist merely of overt phasic reactions, supported and sustained by covert tonic ones in other parts of the body. Tonic sets may develop into

RECONDITIONING OF PSYCHO-PHYSIOLOGICAL MECHANISM

phasic responses and the residuals of phasic responses may serve to shape the tonic sets. The two must meet originally and ultimately in the motor areas of the brain and the spinal cord, for, at any other place, one influence could not act selectively upon the other. The variability of response under constant external stimulation can be explained only on the basis of the fact that separate deviations are not strictly phasic in character but are built upon or out of tonic patterns.

From the standpoint of the Yogic exercises, what concerns us more is a further aspect of these tonic reactions and that is their formation of what we have already described as the 'postural substrate', with its significance as *determinant of behaviour*. For, to treat any of the disturbances, mentioned above, we have to tackle their intrinsic postural substrate through the tonic-interoceptive system. The phasic contractions of the more vigorous gymnastic exercises, athletics, etc., will have little influence on this system, except through their residual effect. Again, it should be noted that tonic contraction is much more economical of energy. In fact, without the proper postural substrate to support the phasic reactions, a person would be occupied in making movements of high metabolic cost. It is especially so during neurosis with its accompanying psycho-physical tensions. That accounts for the feeling of constant fatigue in these cases. The only logical form of activity, then, to be utilised in such chronic disorders to attain and maintain a homeostatic balance would be that of tonic contraction. Even in normal persons, the tonic patterns show a considerable amount of inertia to change. They are slow to react completely, reach the maximum effectiveness gradually, and also subside slowly. Hence, it is useful and advantageous for normal persons too to attend to this 'common matrix' first.

The above discussion is intended only to bring home the importance of the part played by the tonic system in the psycho-physiological behaviour of an organism. There are other reactions involved in the maintenance and regulation of the postural reflexes, particularly the local, segmental and general static reactions, details of which can be found in any text book of physiology. Apart from the proprioceptive neuro-muscular and neuro-tendinous spindles, which record the changing tensions in the muscles,—the eyes, the ears with their labyrinths, and to some extent the skin too, play a part in the very intricate and complex reflex mechanism of postures. Impulses from all these receptors are conveyed to and co-ordinated in the Central Nervous System. The centres that play an important part in the process are the cerebral cortex, the cerebellum, the red nucleus and the vestibular nucleus. A schematic diagram, giving an elementary idea of the chief components of this complex mechanism, is presented in the accompanying illustration. (Fig. 3.)

The foregoing diversion from the subject, though a long one, had to be taken up only to bring out the full import of the special effects of Yogic exercises,

YOGIC THERAPY

and to show how the physiology of ordinary exercises could not be applied to them. Nay, it was also further intended to show how, due to their direct tackling of the 'interoceptive tonic' reaction, their regular practice was calculated to affect beneficially the whole psycho-physiological behaviour as such.

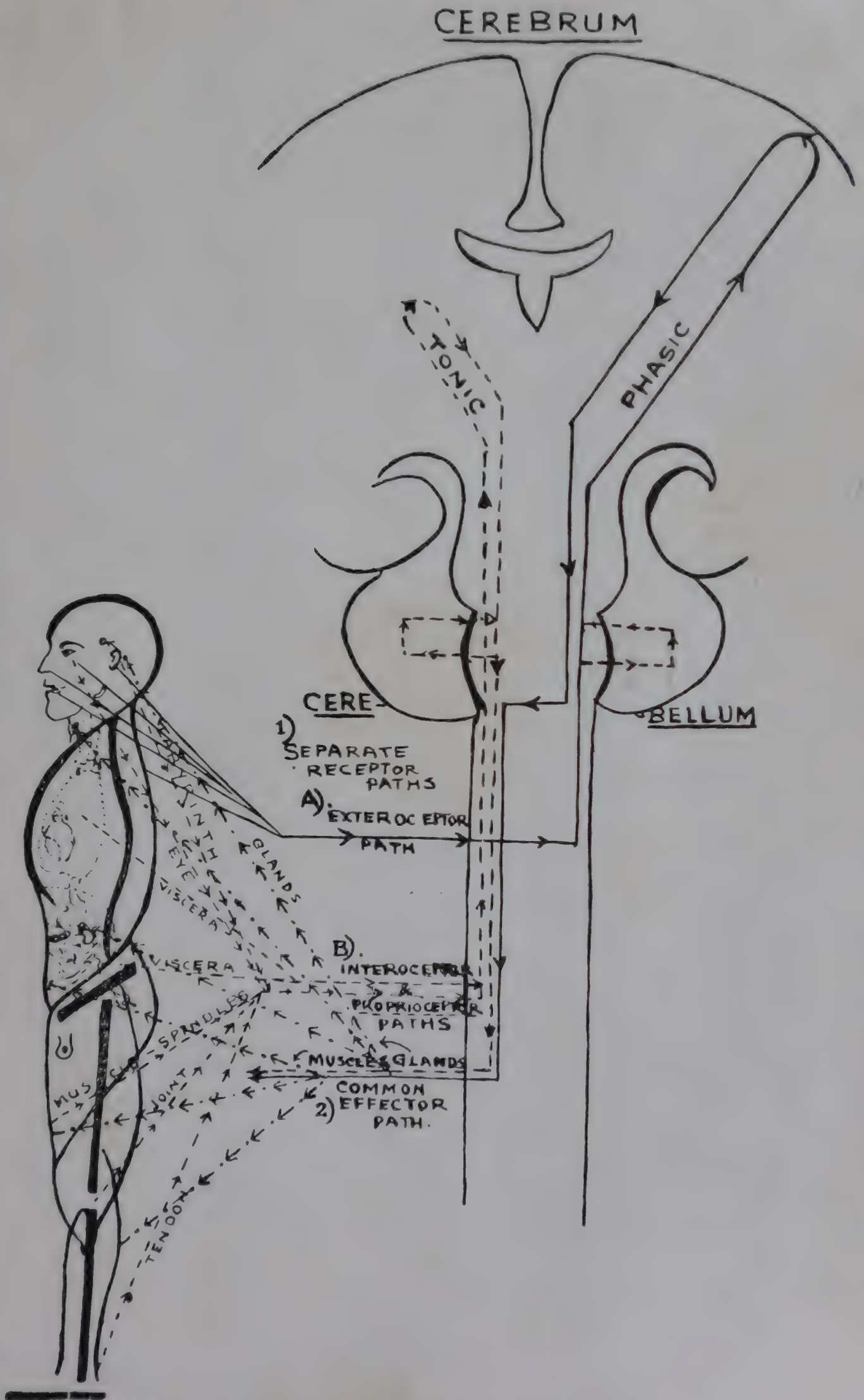
Let us now take up the Yogic 'exercises' that are calculated to tackle this 'common matrix' and see how they do so. The Yogic practices that are used in this procedure can be classified under three broad headings—(1) Āsanās (2) Mudrās and Bandhas and (3) Prāṇāyāmās. The scope and the field of each one of these is vast and varied. It would be very difficult, therefore, to examine them fully in so short an analysis in the light of modern sciences. The following attempt is intended to be merely illustrative,—only with a view to delineate their broad principles and to show how they can have a special place in the treatment of diseases, if used properly and judiciously.

Āsanās :

Āsanās, as their very name implies, are 'postures'. Hence they should be treated and performed as such, and their physiological effects too should not be considered on the basis of the principles of Kinesiology, *i.e.*, physiology of movements, but on that of static and tonic reactions mentioned above which are a special feature of postures.

Unfortunately, man is so accustomed to moving and so obsessed with the idea that exercise must consist of exertion and movements that he does not cease to look upon Āsanās too from that angle. Not only he, but even some of the so-called 'experts' in the field are found to treat them as mere muscular exercise and are seen to stress their movement part! In most of the demonstrations held on public platforms, due mainly to exigencies of the limited availability of time and perhaps also to bring in an exhibitionistic touch of agility and grace, the performances are gone through in very rapid and quick successions, and, on the whole, there is a jerky and jumpy element in them which is to be scrupulously avoided in every Yogic practice (if it is to be really 'Yogic'). It should be understood that a steady posture does not resolve itself into a cessation of neuro-muscular activity, but, as pointed out by Sherrington in his 'Integrative Action of Nervous System'²⁶. "Innervation and coordination are as fully demanded for the maintenance of postures as for the execution of a movement." Superficially, it may appear that the static and tonic reactions involved in the maintenance of posture indicate merely a lower degree of contraction than that of the phasic reactions involved in movements. But the distinction between the two does not lie merely in the degree of contraction. There is a separate neural basis for each, extending as far as the highest neural organ, the brain. In fact, in all the Āsanās, and for the matter of that, in all Yogic practices, we are more concerned with the 'tonic-interoceptive impulses', delineated above, which are not only more economical of energy, but, as already pointed out, have a far reaching psycho-physiological bearing on the behaviour of man.

Fig. 3



A Schematic Design of Tonic and Phasic Reaction Systems.

To get the effects mentioned above, however, Āsanas have to be performed in a particular way. We shall quote here Patañjali and his commentator Vyāsa, the two foremost authorities on this subject, rather extensively.

In his characteristically terse but convincing way, Patañjali, in three very short aphorisms, deals with the principles of Āsanas, their objects and effects and the mechanism through which they are obtained :

(1) “*sthira-sukham āsanam*”, (2) “*prayatna-śaithilyānanta-samāpatti bhyām*”, and (3) “*tato dvandvānabhigātaḥ*”. (P.Y.S. II-46-48).

The first of these aphorisms gives the broad objective of Āsanas, viz., Āsana is that which contributes to stability and a sense of well-being. The stability implied here is not merely the stability of the posture, but that of the mind and body as a whole, i.e., the working stability of both, which would contribute to a sense of well-being. This aphorism is wrongly translated as ‘Āsana is that which is easy and stable’, and on the authority of such a mistranslation, one is told that one could adopt any posture that will be easy to attain and stable to maintain. In that case, perhaps, sleeping should be the best Āsana, being the easiest and the most stable! It is conceived by some that Patañjali has here only meditational postures in view, and what he means is that, for any meditation, it is just sufficient if one were sitting at ease and comfortably stable—in such a way as not to fall down: If this were so, he should have definitely given one very important feature of all meditative postures, namely, ‘*sama-kāya-śiro-grīvatva*’, i.e., keeping the trunk, head and neck straight and well-balanced. But this he has not done. That this is not so has been further granted by so great an authority as Vyāsa, the first commentator of Pātañjala Yoga Sūtras, who has given a list of some twelve illustrative Āsanas, of varying complexities and ‘ease’,—some of them non-meditative too. He has also indicated in his commentary on the second aphorism that the aim of Āsana is to counteract ‘*angamejayatva*’, i.e., instability (inner one) which is due to a disturbance of the tonic rhythm of the body, and which is taken by Yoga as a common concomitant (‘*saha-bhūva*’) of ‘*vikṣepa*’ (P.Y.S. I-31). This ‘*angamejayatva*’, if it continues for long, gives rise to an abnormal fixed and rigid ‘postural substrate’, as shown already. This interpretation of the aphorism is also borne out by Svātmārāma Sūri in Haṭha Yoga Pradīpikā, when he defines Āsana as ‘that which contributes to stability, health and suppleness’ (“*kuryāt-tadāsanam sthairyamārogyam cāṅgalāghavam*”—H.Y.P. I-17). This is the same as that which Patañjali claims for Āsanas, viz., stability and ‘sense of well-being’. It is also quite in consonance with the famous oft-quoted sentence about the effect of Āsanas—“*āsanena rajo hanti*”. i.e., by Āsana one overcomes fickleness,—instability.

The two aphorisms that follow proceed to explain how this can be achieved, i.e., how are the Āsanas to be performed in order to achieve the above results and what happens when that particular method is adopted. And queerly enough for the general public, and the usual Āsana experts who ask of their

students to think of this particular part and that, and also introduce lot of effort into the Āsanas, it has been specifically laid down by Patañjali that these results can be *best achieved by a slackening of effort*—‘*prayatna-saithilyāt*’, i.e., if the Āsana is performed in a relaxed way, and also if, together with it, one turns one’s attention to and contemplates on some infinite entity—‘*ananta, samāpatti*’,—i.e., if one simultaneously tries to feel oneself as a part and parcel of an infinite whole and identifies oneself with it. While there are many who do advocate that Āsanas should be done in a relaxed way, it is rare to find this latter instruction given to make the Āsana effective. We feel, from a neuro-physiological point of view, this is very important. We shall deal with this in the following paragraphs. Let us first complete what Patañjali has to say about the effect of such a procedure and then see whether it can tally with the findings of neuro-physiology.

Patañjali claims that if an Āsana is done aright, as prescribed by him, then it would lead to “*dvandvānabhigātaḥ*”, i.e., ‘an absence of clash between two opposites’. Now, what are these two opposites ? Though Vyāsa starts all right in his commentary on these aphorisms, saying that they are aimed at counteracting ‘*angamejayatva*’,—disturbance of tonic rhythm in the body,—here, in explaining the word ‘*dvandva*’—‘opposites’—he has taken up the usual hackneyed interpretation of such opposites in Indian philosophy, namely, heat and cold, pleasure and pain, etc., which are quite unconnected with the subject-matter in hand—‘*angamejayatva*’. We do not mean to say that Āsanas may not give rise to a feeling of indifference to heat and cold, etc. But that is a long-term achievement, and is to be claimed for stages beyond Pratyāhāra onwards. That this is a psycho-physiological fact, we have enough of evidence in our laboratories. But it is not a result of mere Āsana. Moreover, it stands to reason that since the subject-matter in hand is that of tackling ‘*angamejayatva*’, this third aphorism too must have a bearing on the same. And viewed from this point, we find here a very beautiful explanation from Patañjali himself about how this freedom from ‘*angamejayatva*’ is achieved. Patañjali evidently means that ‘*angamejayatva*’, or disturbance in tonic rhythm, is due to a clash, a disharmony, a lack of reciprocity between two opposite neural impulses or, as he might put it, impulses of ‘*prāṇa*’. And he clearly shows that an Āsana, when done properly, i.e., the way he has indicated, will help to stop this disharmony and overcome ‘*angamejayatva*’, and thus restore the harmonious working of the whole system, especially of the neuro-muscular tone. Everyone knows that the nerve impulses are of two types—facilitatory and inhibitory. The tonic impulses are no exception to this rule. In the muscles, too, there is an arrangement which acts on the joints mostly in opposite directions, and there is in these what is called a ‘reciprocal innervation’, i.e., when the nerves serving one muscle send it impulses to contract, those that serve its opposite muscle send it impulses to relax proportionately and give in gradually in a *smooth* way. This helps a smooth bending and stretching of the joints. These opposite functions are spread over in every system of the body and a smooth harmonious working of the body and mind depends

RECONDITIONING OF PSYCHO-PHYSIOLOGICAL MECHANISM

upon a judicious reciprocity in the two opposite functions. What Patañjali seems to have in mind by '*dvandva*' here is such opposite functions in the body, and what he means to say is that, if Āsanās are done in the proper way, as indicated by him, there would be no clash ('*abhighāta*') between them; instead, the natural reciprocity would be restored, and the body and mind would again start functioning harmoniously. In short, the word '*dvandva*' here is not meant for the external '*dvandvas*' but for internal ones.

How this is quite in keeping with modern neuro-physiological findings we shall see presently.

Analysis and study of the abnormal postural reflex activity by Sherrington, Magnus, de Klyn and others in animals and patients with various lesions of the Central Nervous System have brought to light many new facts about the behaviour of the neuro-muscular system. (i) Firstly, that the motor disability is largely due to the fact that the lesions release the *primitive* and wide-spread reflex patterns of posture and movements from the inhibitions normally exerted by the higher centres of the Central Nervous System; (ii) that muscles are grouped in co-ordinated action patterns, some controlling, some holding and others relaxing, and that these patterns are phylogenetically and ontogenetically (*i.e.*, evolutionally,—according to the evolution of species and the individual) older ones; (iii) that a large part of our so-called voluntary movements is automatic and outside consciousness and this applies especially to postural adjustments of various parts of body which accompany them; (iv) that the Central Nervous System uses its lower centres of integration for the maintenance of posture and equilibrium. These integrating centres are in the medulla, pons, cerebellum, mid-brain and basal ganglia; when these are released from the restraining influence of the higher centres, especially that of the cortex, an abnormal postural reflex activity ensues; such released patterns of posture are typical and stereotyped and involve all muscles of the affected part or sometimes the whole body.

The motor responses that result from a group of postural reflexes integrated at these sub-cortical levels have been designated as 'Principal Motility'. These reflexes cannot be elicited or observed in intact human beings, as they become largely modified by the activity of the higher centres into more differentiated and more complex patterns. Study of individual postural reflexes enables one to analyse the motor behaviour of patients with lesions of Central Nervous System, how certain distinct patterns of reactions can be traced to the domination of one or the other single postural reflex. In less severe cases, only traces of typical tonic reflex patterns can be observed. Here one may not be able to elicit the reflexes proper but only find their influence in changing the distribution and degree of tone when one tests the resistance of the muscle to passive movement.

It must be borne in mind that it is these postural reflexes that play a dominant role in the regulation and distribution of muscle tone. And most of these are elicited by the stimulation of sensory end-organs in muscles, joints and tendons, and by the labyrinths (all of which jointly are known as 'proprioceptors'). While this is all true of animals, one thing that is to be noted in human beings is that, in the process of the evolution of maintaining an upright posture in standing, walking, etc., and of the complex prehensile and skilled activities of arms and hands, the development of cerebral cortex has led to a greater inhibition of the activity of subcortical centres and these latter have lost their autonomy and have been relegated into the background. Thus while an animal, below the order of monkeys, with lesions above these lower centres (with thalamus intact) can maintain a normal distribution of muscle tone when on its four feet, and is also capable of walking, monkeys and men, with the same type of lesions, have an abnormal posture and are quite unable to walk.

The above observations will bring to light a few things glaringly.

- (1) The degree of muscle tone and its distribution are regulated to a large extent by postural reflexes.
- (2) These postural reflexes are integrated through the lower centres,—mainly by medulla, pons, cerebellum, mid-brain and basal ganglia, (Fig. 4).
- (3) The postural patterns integrated by these centres are phylogenetically and ontogenetically older ones.
- (4) While animals lower than the order of monkeys can maintain a normal postural tone and are even capable of walking when the lesions are above the thalamus, monkeys and man with such lesions are incapable of walking and also have abnormal posture, showing that these have become more dependent on intact cortical activity.

As corollaries to the above, one could judiciously draw the following conclusions:

- (1) In any intact human being, with no such lesions of the Central Nervous System, the disturbance in the tonic rhythm is largely due to a faulty inhibitive effects of the higher centres, especially the cerebral cortex.
- (2) In order to re-establish the harmony of the tonic rhythmicity, one has to arrange it in such a way that the inhibitory control of the higher centres over the lower posture-integrating centres is slackened.*
- (3) The postural patterns, adopted to give a free scope to the lower centres should be the ones that are generally found when these centres are released from the inhibitory control of the higher centres. (as observed in various lesions of the Central Nervous System). These patterns

*The lower and higher centres mentioned herein refer to the brain centres only. The higher ones are those in the cortex and the lower ones are sub-cortical.

are 'abnormal' so far as the human being is concerned and belong to a lower and older rung, phylogenetically and ontogenetically.

These three points would explain the rationale behind most of the queer postural patterns found in the system of Āsanas and also the reason why there should be a slackening of an effort in their performance, and, what is better, how and why, once the postures are adopted with their various locks and holds that help their maintenance, one should take away all of one's attention from them and centre it on some infinite entity, i.e., resort to '*ananta-samāpatti*'. Effort signifies an activity of the higher centres and we are here specifically to avoid it in order to allow a free play to the lower centres. Even when the effort is slackened, the very consciousness that one is in an abnormal posture is enough to bring into play the interference from the higher centres, willy-nilly! It is just for this reason that Patañjali advises one to take one's mind off from the posture and engage it in some other spot, i.e., try to do '*ananta-samāpatti*'. One may wonder why Patañjali should particularly suggest such an attempt at 'attunement with the infinite,' instead of anything else. We can give only the reasons that we can surmise. Firstly, any other thought is likely to lead to an emotional effect and this will at once automatically bring the higher centres to influence the lower ones. Secondly, such an attempt in itself contributes to relaxation. This process is also called '*mahāhradānusandhāna*', meditating ('*anusandhāna*') on the ocean,— 'very big lake' ('*mahāhrada*'). While doing so, one feels one is relaxedly floating on the surface of a vast sheet of water, nay, that one is just a ripple or a drop of the ocean itself, undulating on it, being its own part and parcel. This is known in mystical literature as an 'oceanic feeling'. One has only to try it to know how relaxing it is.

From the above discussion, we could easily conclude the following :

- (1) Āsanas are primarily meant to overcome '*angamejayatva*', i.e. disturbance in the tonic rhythm of the body, and thus re-establish a harmonious functioning of the whole system.
- (2) They are *not mere postures but certain postural patterns*, belonging, phylogenetically and ontogenetically, to a lower and older rung: as such, they are bound to look rather queer and 'abnormal', and it is no wonder that many of them bear the names of beasts, birds and reptiles, whose postural patterns they try to imitate, while some others seem to recapitulate the early phases of our intra-uterine infantile life.
- (3) These patterns are purposely resorted to in order to give as much free scope to the lower centres of integration as possible. So, from the point of their effectiveness, it is the *patterns* of these Āsanas that are of very great importance. They are purposely devised so as to enable the lower centres to restore the original balanced tone of the body.

- (4) For the same purpose, one is advised to maintain them in that condition with as little an effort as possible, *i.e.*, retain the 'positions in a relaxed way. The best way to make this possible is to take one's mind off from the positions by trying to think of attending to something else, preferably, as Patañjali points out, to contemplate on Infinity. Another method to achieve the same is, as mentioned above, to cultivate an 'oceanic feeling'. This, when carried to its logical end, not only relaxes the whole body and mind, but facilitates overcoming the feeling of a separate 'I' persona.

A third tradition requires one to resort to what is called '*prāṇadhāraṇā*' on such occasions. This is done by attending to the incoming and outgoing flow of breath and feel its touch on the part of one's nose, it being mostly the tip of the nose initially. There is a cool sensation when one breathes in and a warm one when one breathes out. When one does so, one also attempts to breathe in a little deeper and rhythmically. This too helps one to relax properly and allow a free play to the primitive tonic impulses of the particular *Āsana*.

One may not be able to exactly assume the postural pattern of an *Āsana* initially. One is, however, advised not to strain to attain it. What is required is to assume a posture that is as near to the pattern as possible, *i.e.*, imitate it,—in as comfortable and relaxed way as possible. The body will yield slowly and pleasantly. The sensation, we will feel on such occasions, will be that of just some pleasant pain. But even that pain one is to forget, and 'sit', 'stand' or 'lie' down, as the case may be, in the particular posture-pattern with as less effort as possible, just as one does in normal sitting, standing or lying down in a relaxed way. Most of the time, one just forgets how one is sitting or standing. so it should be in the maintenance of these *Āsanas* too. The tricks to achieve this 'forgetfulness' have been described in the preceding paragraph. But this 'forgetfulness' is not a negative one, but a very positive way of obtaining the utmost relaxation of mind and body.

It is well-known that generally to-day *Āsanas* are not performed the way that has been prescribed here. Our own books too had failed to bring out these points clearly. We have here to improve upon our own original stand through our experience and deliberations. It is for man to accept his faults and try to progress, ever and anon. The fact that *Āsanas*, even when not done so perfectly, do render results is one that goes further in their favour. If they could be so helpful, even when performed imperfectly, how much more could they be when resorted to with proper understanding and in a correct way !

Whenever one starts any particular activity, it is but meet that one should know what to expect from it. Nay, in expecting such effects, one should also understand the exact mechanism by which these effects, in fact, arise and how to set that mechanism in proper working order to derive those desired effects. Our

endeavour here is to explain these two things, for if one were to start doing a thing without such knowledge and preparation, the results many a time will be left to chance. One is most likely to meet with pitfalls. Danger and disappointment are bound to result where there is error of judgment and false expectation. It is common for us to hear not only from lay people, but even from men of medicine, complaints of sprains, fibrositis, and even minor fractures during the practice of Āsanas. Thus, instead of getting any benefits from them, one happens, only due to lack of 'know-how', to inadvertently land one's self into unnecessary worries and troubles, and has sometimes even to spend a good lot of precious money and time to overcome them. Thus, a whole system comes to blame due merely to over-enthusiasm and rashness on the part of some careless folk.

Āsanas are spoken of as 'exercises'. It is, therefore, necessary for us to see whether they are, and if so, what sort of exercises they are. Before dealing with Āsanas as 'exercises', it would be better for us to clear the ground by dwelling a little on the problem of exercises, as such. To the average man, the term 'exercise' generally brings to mind, apart from the usual walking or running exercises or the recreational ones, like games, etc., one or the other systems of 'physical jerks', that are aimed at developing various outer muscle-groups of the body, one after another. These jerks are usually carried out against some graded resistance, with or without accessories, like dumbbells, bar-bells, etc. In most of the gymnasias of the present day, these 'systems of jerks' prevail, and heavy exercises have come to be accepted as a form of ideal physical training, not only for the cultivation of muscular strength but also for the health of the body. Bumpy skeletal muscles are supposed to increase one's physical fitness and assure vigorous health. It should be noted, however, that many athletes, acrobats and 'strong men' have been found to suffer from some acute or chronic disease. Some other gymnasias specialise in exercises of dexterity, in the use of some ancient weapons of defence and offence, which it is claimed not only contribute to alertness and agility of mind and body but by affording an opportunity for plenty of free and 'natural' movements encourage the harmonious development of skeletal muscles and ensure good and stable health under hygienic conditions. Most of the orthodox Indian gymnasias have these activities along with Indian exercises like Malla-khamba, Karela, etc. It must be said that there is less of jerky movement in such activities. They are mostly rhythmic in nature and calculated to exercise the body as a whole.

There is no doubt that muscles do help in attaining health and fitness by their regular rational employment in physiologically useful work. But such results are not derived from the type of muscular exercises which merely have a local influence on certain parts of the body. For general health and fitness, muscular work should be physiologically and hygienically of the right kind. That is, it should consist of well-co-ordinated rhythmical movements

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YOGIC THERAPY

which are specially designed more for organic and functional promotion than for mere muscular development or agility and skill. Such physiologically sound and methodical exercises constitute what is scientifically known as 'hygienic exercise', as distinct from ordinary gymnastics and other strenuous exercises. What the average man needs is such 'hygienic exercise'. Even for those that have a desire to shine in the field of sports and athletics, these exercises are bound to help their cherished aims by further contributing to their all-round stamina and efficiency.

The following is a broad classification of the various types of exercises that are in vogue today.

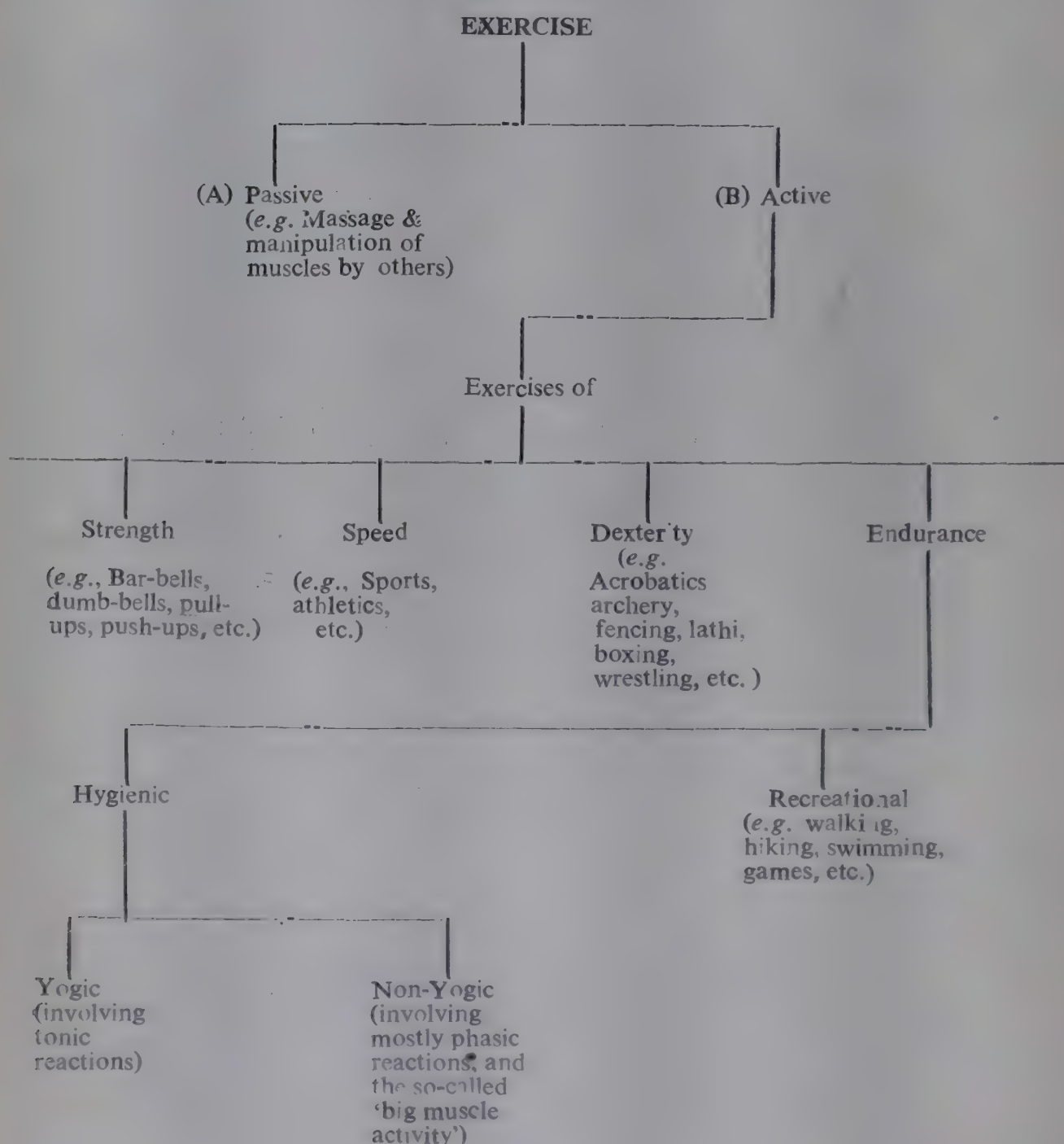
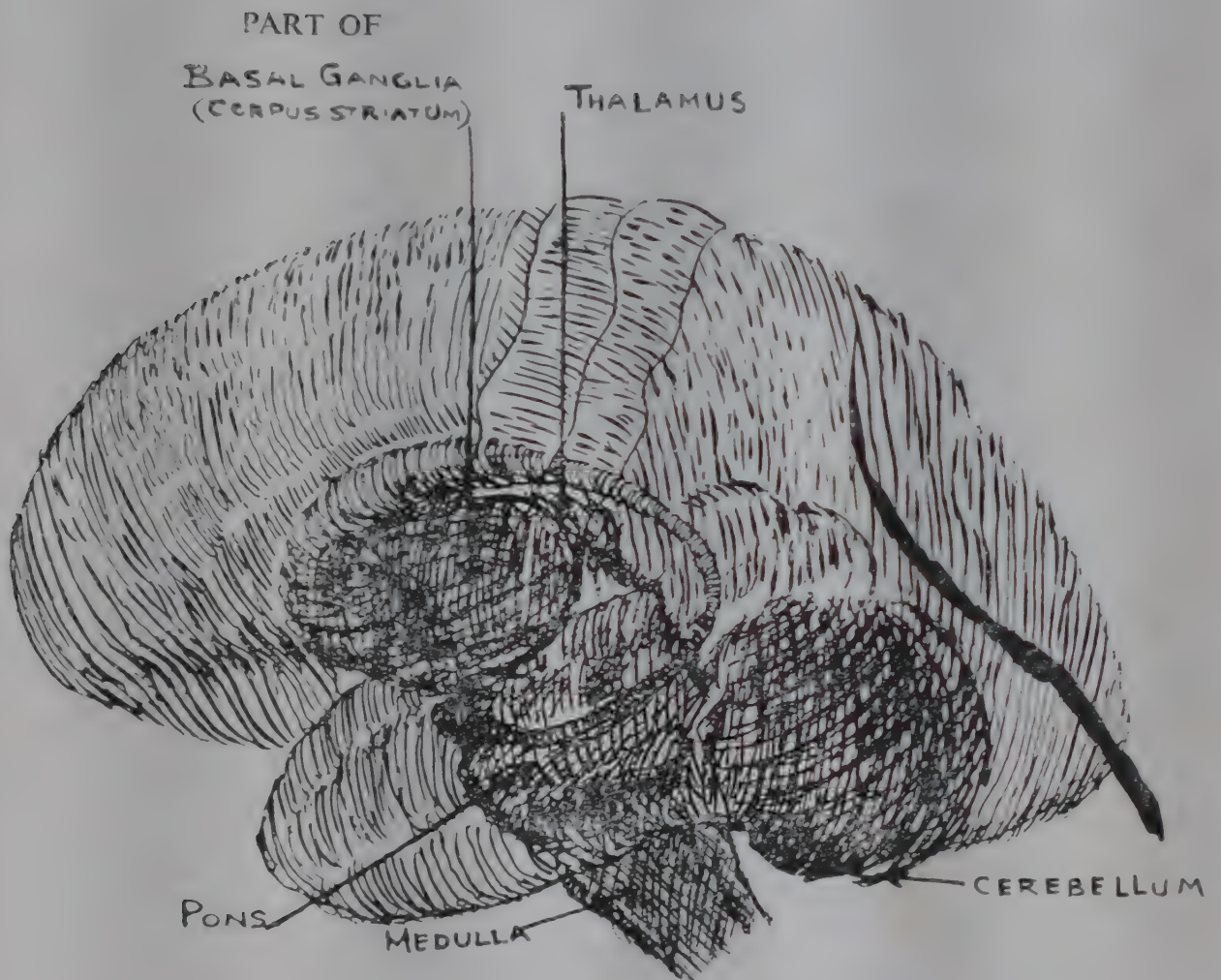


Fig. 4



POSTURE-REGULATING
LOWER CENTRES OF THE BRAIN

(A PHANTOM VIEW WITHIN CEREBRAL HEMISPHERE)

It is these centres that are given a free scope in Āsanās.

RECONDITIONING OF PSYCHO-PHYSIOLOGICAL MECHANISM

These are not water-tight compartments. There can be many items of exercise which belong to more than one of these categories. Thus, though exercises of speed will primarily aim at speed, they will still require a considerable measure of strength and dexterity. So also, exercises of dexterity will primarily concentrate on the training of eye and other sense-organs, and meticulous instantaneous co-ordination of several groups of musculature, but they also involve a measurable amount of strength and speed. The classification is made on the main results aimed at. The expression 'Exercises of Endurance' signifies a frequent repetition of movements in an unhurried and rhythmic way, carried out for fairly long duration, with an eye more on the development of stamina than strength. And hygienic exercises, at least most of them, consist of such exercises but purposely designed to be wholesome and helpful in every way, after a great deal of scientific investigation and research.

In the light of discussions above, Āsanas should be termed 'hygienic exercises', if the traditional claims for them were to be accepted. And yet, they cannot all be classed under 'Exercises of Endurance', if we are to understand by that term 'frequent repetition of light and rhythmic movements, carried out for long duration'. For, by implication and by actual performance, Āsana means a posture. These postures are, of course, required to be maintained for long duration to be effective but they are not to be repeated—at least most of them—as frequently as the movements in Exercises of Endurance. How can we then call these mere postural exercises hygienic? To understand this, we shall have to go into some detailed consideration of the mechanisms of 'postures' and their effects on the body.

Definition of Posture

Posture may be defined as an attitude, assumed by the body (i) either with support, during muscular activity, or (ii) by means of the co-ordinated action of several muscles working together, (a) to maintain stability, (b) to form an essential basis for any movement, this basis being adapted constantly to the type of movement, that is super-imposed on it.

Efficient Posture and its Development

An efficient posture is one that fulfils in the most economic way the purpose of the specific activity for which it serves as a background, *i.e.*, which involves no unnecessary amount of muscular effort for its maintenance and adjustment. Such an efficient posture would develop quite naturally provided the inherent mechanisms are healthy and intact, with an adequate 'tone' in the muscles involved.

Classification of Postures

Postures can be broadly classified into (A) Inactive and (B) Active, these latter being further sub-divided into (i) static and (ii) dynamic.

Āsanās present all these varieties of postures.

(A) Inactive postures are those that are generally adopted for resting or sleeping. In this class of postures there is a general relaxation of all the musculature, except the one that is required to maintain life, *e.g.*, one that is involved in respiration, blood-circulation, etc. These latter activities too are reduced to a minimum. Under this heading will come Āsanās that are used for training in general relaxation, *e.g.*, Śavāsana, Makarāsana, Adhvāsana, etc. It must be noted here that relaxation is an art in itself.

(B) Active postures, which may be either static or dynamic can be maintained only by the integrated action of many muscles.

(i) Static postures are those wherein a constant pattern of posture is maintained stably by the inter-action of groups of muscles working more or less statically to stabilize the joints and to preserve a state of equilibrium against gravity and other forces. Several of the cultural Āsanās belong to this group. The Meditational Āsanās are static postures too. They, however, can be easily maintained in a semi-relaxed state because of the broad base that is afforded by the adjustment of the lower extremities.

(ii) Last of all, we come to the dynamic postures. In this class, the pattern of posture gets constantly modified and adjusted to meet the changing demands of movement. Most of the Corrective Āsanās and a few of the Cultural ones too, like Hala, Bhujanga, Śalabha, etc., belong to this group. The difference between the brisk dynamic exercises of repetitive movements and these is that though there is some movement in these Āsanās, it is carried out in a slow and sustained manner, attending more to the slowly changing basic pattern of neuro-muscular attitude of the body than to the activity of movement itself. Even in these dynamic postures it should be possible, with a little practice, to retain the 'oceanic feeling'.

With this preliminary knowledge of postural classification of Āsanās, let us now go a little deeper into their mechanism.

Mechanism of Active Postures

(a) MUSCULAR ASPECT

In any of the active postures, muscle work will vary both in intensity and distribution according to the pattern of posture, on the one hand, and the physical characteristics of the individual who tries to assume them, on the other.

The groups of muscles that are mostly employed in this class are those that are used ordinarily to maintain an erect position of the body, counteracting the effects of gravity. These are, therefore, known as 'anti-gravity muscles' and their action with regard to joints is usually that of extension, *i.e.*, straightening the limbs.

RECONDITIONING OF PSYCHO-PHYSIOLOGICAL MECHANISM

Muscle fibres are of two types, one 'red' and the other 'white'. Red fibres have their colour because they contain muscle haemoglobin, a pigment that is a rich source of energy. White muscles lack such supplies for prolonged expenditure of energy and consequently they get fatigued easily. They contract quickly, reach their highest tension in contraction more rapidly and also relax to a normal resting state rapidly. The postural extensor muscles (that normally are employed in straightening of limbs and are engaged in posture, to maintain prolonged equilibrium against gravity) mostly consist of red fibres. They can, therefore, stand sustained contraction for a considerable length of time without fatigue.

(b) NERVOUS CONTROL

Generally, a steady posture is supposed to signify an attitude where there is a minimum of neuro-muscular activity. That this is not so, we have already indicated when we just started on the topic of Āsanas and quoted Sherrington to support our point !

Maintenance and adaptation of postures is due to several fine and automatic neuro-muscular co-ordinations. The various groups of muscles involved are controlled by means of a very complex reflex system of activity. This is the most crucial and important point in understanding the mechanism of Āsanas. Readers should pardon us, if we stress upon this 'reflexive behaviour' again and again. It is not only of importance in Āsanas, but in every other Yogic exercise, as also in understanding emotional behaviour. In fact, throughout our discussion of Yogic exercises, we shall be concerned with what are sometimes known as 'tonic reflexes', which, are not only more economical of energy but have a far reaching psycho-physiological bearing on the behaviour of man.

The maintenance of the tone of the muscle is, by far, highly essential for any efficient functioning of the muscle. In order to effect smooth purposeful motor performance, the muscle must remain in a certain state of preparedness, or waiting, for the phasic contraction. Our fore-fathers likened it to the string of the bow. The bow functioned well if the string was taut enough. If it was loose, no arrow could be shot by the bow. If the bow was high-strung, it would overshoot the mark. In fact, even today if a person is having high 'nervous tension', we say that he is 'high strung' ! Not only does this condition heighten the reflex activity but much extra energy is wasted in maintaining a high steady contraction in muscles, with the result that fatigue occurs easily and there is no real rest, even when one tries to relax or sleep. A better simile would be that of a violin or a veena. A violin or a veena can give good music only when its strings are adequately tuned. So too, real health consists in a balanced dynamic adjustment of opposing tendencies (Patañjali's '*dvandva*'). Behind the strife between the opposites, according to measure, there lies a hidden harmony or attunement. This existence of harmony is usually overlooked. As Heraclitus said, "Men do not know what is at variance

YOGIC THERAPY

agrees with itself. It is an attunement of opposite tensions, like that of the bow and the lyre". Āsanas,—for the matter of that, Yoga itself tries to find harmony in things that are at variance.

The quality of tone in a resting muscle can be clinically determined by touching the same with a slight pressure, or better, by evaluating the resistance encountered in the muscle when the muscle is made to stretch passively. If this resistance is increased, the condition is known as 'hypertonia'. If the resistance afforded to each passive stretch is diminished or absent the condition is called 'hypotonia'. Extreme conditions of hypotonia together with what is known as 'hypo-reflexia' (sluggishness of reflexes) is known as *flaccidity* of a muscle, while the extreme condition of hypertonia, with an increase in reflex activity, designated as 'hyper-reflexia', is clinically denoted by the term *spasticity*. There are two types of muscle paralysis, one flaccid paralysis and another spastic paralysis.

Normally, a balanced tone is maintained in muscles which facilitate such adjustments as are necessary for phasic movement as well as for postural activity. When this balance is upset by disease-processes, varied symptoms and signs present themselves, mostly in the form of involuntary movements, loss of certain normal movements, and the presence of such abnormal states of muscle tone as spasticity, rigidity, hypotonia, flaccidity, etc., with a disturbance of deep reflexes.

Apart from the disease-processes, other disturbances in the muscle tone occur mostly due to a generalised heightening or a generalised reduction in the stretch-reflex mechanism due to psycho-physiological stresses of everyday life. Emotions and mental attitudes have a profound effect on our nervous system as a whole and this is reflected in our postures through these tonic reactions. Thus, joy, happiness and confidence stimulate and bring about an alert posture, in which positions of extension predominate. One straightens oneself, puts out the chest and holds the head 'high'. Opposite is the case in unhappiness, mental conflicts, and feeling of inferiority. In this condition, the attitude that is generally adopted is one of flexion with the head bent down, back curling forward and chest sunken inwards. Anger makes one stretch oneself to full height, but with a disturbance in the muscle tone giving rise to tremors. Fear increases this disturbance to tottering. Extreme terror makes one go down flop, with no tone in the muscles at all. It is certain, thus, that the mental attitude does affect the physical one, either temporarily or permanently. Is it possible that this can also happen in reverse? In other words, may not a physical attitude be adopted consciously so as to affect the mental one? Yoga seems to assert that it should be possible, provided we tackle this problem of tonic rhythm aright. In doing so, it interests itself in the factors that influence the tone of the muscles, so that one may be able to set it right. The chief factors that contribute to an optimum muscle tone are :

- (1) A stable psycho-physiological background.

RECONDITIONING OF PSYCHO-PHYSIOLOGICAL MECHANISM

- (2) Good hygienic conditions of life and environment—particularly with regard to nutrition and sleep.
- (3) Full scope for abundant and free natural movements.
- (4) Cultivation and maintenance of correct postural habits.

It is clear that the working conditions of this fast machine-age do not encourage any of these. Long sedentary hours of work, whether at the desk or at the machine, in congested rooms or halls, cannot at all be congenial for a good and adequate muscle tone. Economic stresses and daily socio political excitements too contribute to this imbalance in no small way. It is true that outdoor exercises and recreations, like brisk walks, games and gymnastics help a good lot to counter-act the deficiencies. But with all their other advantages, it cannot be said that they systematically and purposely tackle this problem of cultivation of an adequate muscle tone. Every contraction exercise, no doubt, brings in reciprocal stretching of the antagonist muscles and the stretch reflex is brought into play, willy-nilly. But this is not done in a rational and purposeful way. Again, it has to be borne in mind that there is much more movement of extremities, *i.e.*, hands and legs, in these; movements of the trunk are only secondary. It is mostly a 'big-muscle activity' on the whole. The small deep extensor muscles of the vertebral column, which together form quite a big mass of muscle tissue, are rarely acted upon in a systematic way in any of these activities. Health and suppleness, especially after a certain age, depend more on the tone of these deep muscles of the spine rather than that of the extremities. When we consider all these points, the importance of the systematic way in which these are worked upon by the Cultural Āsanas will easily be realised. The whole vertebral column is treated like a chain of so many links, with muscle elements between each pair, and each region is subjected to concentrated stretching and twisting systematically. And so too are the various muscles of the abdominal wall. True, greater stress is laid on the tone of the trunk than that of the extremities. But that is not without sound reason. The muscles of the extremities too are jointly and severally subjected to special weight-bearing and balancing anti-gravitational stresses that contribute to an optimum tone in them. Thus, Āsanas not only make for an elegant waist-line, but tone the whole system too, marvellously. The effect of course is much less of a muscle-building character than what is prevalent in most of the modern gymnasias. But it is now recognised in the scientific world that big bulging muscles are not necessarily a sign of health and stamina. In this age of scientific mechanisation, there is little use for such extraordinary muscular development. What is more, such over-developed muscles act only as parasites, as the body ages down, and drain the vital organs, sapping their energy and nutrition to feed themselves. Our readers are requested to understand that this criticism is a constructive one and is not resorted to in any spirit of narrow-minded intolerance.

YOGIC THERAPY

Before we leave this topic of Āsanas, it will not be out of place to utter a word or two of caution for those who, in their over-enthusiasm or ignorance, do not take into account the rigidity of their body and simply try to imitate a given illustration of an Āsana to the fullest extent by either straining themselves too much or by asking somebody to press or pull their limbs so as to reach the final stages of the Āsanas quickly. This is not only not helpful but is definitely risky. As we have shown in this chapter, in performing Āsanas as exercise, we are training our various reflexes gradually and this is not at all helped if an undue pull or pressure is exerted on the limbs. The only result of this is some sprain or tear of fibrous tissue, giving rise either to temporary or permanent disability. Āsanas should be resorted to with a full consideration of one's age and bodily condition, and not in any competitive or emulative spirit. It is not always the range of movement that contributes to 'exercise' in Āsanas. The effect is relative to the condition of the bodily muscles, that is, even a small range may give sufficient exercise to a heavy or hypertonic person, while even the full range may not seem sufficient to the hypotonic. But both will gradually regain their balance of tone, in the longer run, if they continue to practise Āsanas regularly. The illustrations of the Āsanas given in any chart are to be treated merely as 'ideal patterns' which one has to strive to reach, *one day*, in the longer run. The limit for the range of movement for each individual would be just a sensation of 'pleasant pain' felt by him as he performs an Āsana,—and *no more*.

In spite of what is being claimed as the special effect of this Āsana or that, it should be noted that no disease, according to Yoga, can be completely cured by the practice of one single Āsana or even Mudrā, nor, for that matter with the performance of these Yogic exercises alone. All these are a part of a composite treatment. This is quite in keeping with the outlook of Yoga on the problem of disease, which we have explained in the preceding pages. *Yoga regards no disease as a local affection but as a critical change in the body system as a whole.*

Āsanas are best started from the age of adolescence onwards. Though some of the balancing postures could be prescribed with advantage for minor children, the strenuous bending and stretching exercises are not of much help to them. Mudrās are definitely contra-indicated in the case of children.

We shall be giving some Āsanas or postural patterns at the end of this booklet for the daily practice of its readers, with a caution that, to achieve the best results, they should be gone through *very relaxedly*, as indicated herein, *keeping an eye on the pattern of the posture* rather than trying to accomplish the exact posture itself. There should be *no violent effort* at any time. Every movement should be gone through in a very relaxed and pleasant way, and when the final position is arrived at, it should be maintained for a time in

as relaxed a way as possible. The tips as to how to achieve this have been given in these pages. The duration of maintaining each Āsana should be gradually increased to obtain its specific results.

Mudrās and Bandhas

Mudrās and Bandhas are a special feature of Haṭha Yoga; most of them consist of certain neuro-muscular locks and involve changes in the internal pressures to a very high degree (Fig. 5). These have a direct effect on the visceral tone, various glandular secretions, including endocrinal, and also on some of the vital nerve plexuses. It is claimed in the traditional books that the excretion of urine and faeces is decreased by Yogic exercises of this type ("*kṣayo mūtra puriṣayoḥ*"), particularly by the practice of Mūla and Uḍḍiyāna Bandhas which produce a sub-atmospheric pressure of varying degrees, according to the practitioner's ability, in the thoracic and abdominal cavities. In this connection, it has to be noted that cortisone and carbonic anhydrase, a brain-enzyme discovered recently, both have been found to bring about a similar change in water-metabolism. Clinical experience of these Bandhas, as well as of the topsy-turvy Mudrās, e.g., poses like Śīrṣāsana (Head stand), Sarvāṅgāsana (Shoulder stand), etc., which too bring about a similar pressure change in the lower abdomen, points to a similarity of action between these and cortisone. Thus, apart from the lowered excretion of urine, these exercises have also been found to have beneficial effects in exactly those very conditions where cortisone therapy is indicated. The contra-indications of the two also seem to be similar. Particularly, one may refer to a case of long standing high eosinophilia (70% c.mm), where practice of mere Śīrṣāsana (Head stand), without any medication, for about six months, was found to have decreased the eosinophilic count to about 12-17% c.mm. Theoretically it seems quite conceivable that the sub-atmospheric pressure in the abdominal cavity, that is produced by these exercises, may result in stimulating the superficial layers of the adrenals, i.e., the cortical layers, to produce more of cortisone. The problem, however, needs accumulation of further clinical evidence, backed by proper laboratory investigations, before one can arrive at any definite conclusion. The reference here is intended only to show the vast possibilities of Yogic research and the prospects of a new vista in the field of remedial medicine.

From what has been described above, it will be noted that, though they look very innocent, easy and harmless, *Mudrās and Bandhas have to be resorted to rather very cautiously*; they are like the specific therapy of modern medicine. Their physiological effects are at times so drastic that even a slight over-dose may expose the practitioner to great risks. As said before, Mudrās and Bandhas are definitely contra-indicated in the case of children. They could be started from the age of late adolescence onwards, say, from the age of fifteen or sixteen in the case of boys, and twelve or thirteen in the case of girls. But, as

is well known, adolescence depends upon racial, climatic and individual variations. The Mudrās that are used during the Prāṇāyāmic processes are called Bandhas as they help to lock and/or guide the pressures in one particular direction.

Some Mudrās and Bandhas have been given in this booklet at the end with specific instructions how to perform them.

Prāṇāyāma

The various types of Prāṇāyāma, as they are in vogue today, (and there are many of them) essentially constitute a volitional control of breathing and, as such could be called 'breathing exercises', but there is this difference,—the stress is not on deep breathing and its oxygen value, as is common in similar exercises prevalent in the Western countries. In Prāṇāyāma, the stress seems to be laid more on the development of the state of '*Kumbhaka*', i.e., the phase of temporary suspension of breath. For all practical purposes, therefore, '*Kumbhaka*' can be considered to cover the whole connotation of the term Prāṇāyāma. In fact, in Haṭha Yoga, Prāṇāyāmas are known by the name '*Kumbhaka*' (—"*āsanaṃ kumbhakaṃ citraṃ mudrākhyam Karaṇam taṭhā, tato nādānusandhānam haṭhā bhyase kramo mataḥ*" H.Y.P. I-56-57). The '*kumbhaka*'s are naturally of three types : (1) '*ābhyantarā*' or '*pūrṇa*' *kumbhaka*, i.e., suspension of the breath after maximum and deep inspiration, retention of the inspired air, with some or all of the inspiratory reserve, compressed in the alveoli, i.e., with the intra-pulmonic pressure raised; (2) '*bāhya*' or '*sūnya*' *kumbhaka*, i.e., suspension of breath after a full expiration not only of the tidal air but also some or all of the expiratory reserve, i.e., with the intra-pulmonic pressure lowered*; and (3) '*kevala*' *kumbhaka*, or suspension of breath in a mid-stage, keeping the intra-pulmonic pressure equal to that of the atmosphere. This last is supposed to present itself automatically after a good deal of practice of the former two. Haṭha Yoga

*A note on lung volumes and capacities:

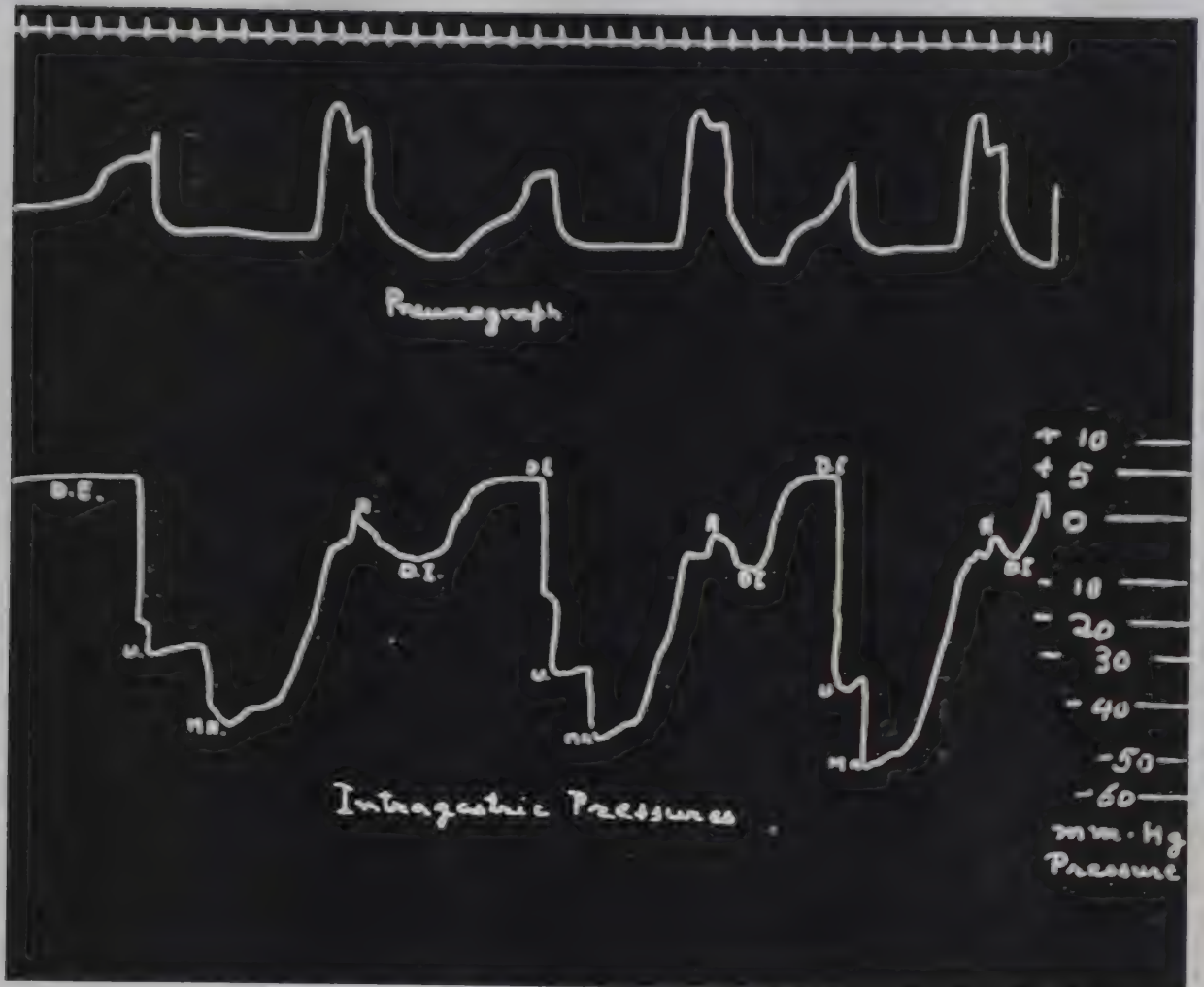
The following nomenclature has been agreed upon by most physiologists for terms and definitions of lung volumes and capacities :

(A) Volumes :

- (1) Tidal Volume—is the normal depth of breathing, i.e., volume of air inspired or expired during each respiratory cycle.
- (2) Inspiratory Reserve Volume—(formerly called 'complemental or complementary air') is the maximal amount of air that can be inspired after reaching the normal end-inspiratory position.
- (3) Expiratory Reserve Volume—(formerly 'reserve or supplemental air') is the maximal amount of air that can be expired after reaching the normal end-expiratory position.
- (4) Residual Volume—(formerly called 'residual capacity or residual air')—is the volume of air in the lungs at the end of maximal expiration.

(Contd. on page 41)

Fig. 5



UDDIYĀNA AND NAULI

A kymographic record to illustrate the pressure changes that occur in Uddiyāna and Nauli. The negative pressures produced here are about 35 mm. Hg. in Uddiyāna and 55 mm. Hg. in Nauli (Madhyamā). The range of negative pressures in these two have so far been found to vary between -20 and -80 mm. Hg. in Uddiyāna and between -50 and -120 mm. Hg. in Nauli.

D.E.=Deep Exhalation

U.=Uddiyāna

M.N.=Madhyamā Nauli

R.=Relaxation

D.I.=Deep Inhalation

requires these Prāṇāyāmas to be practised along with some Bandhas. Thus, the controlled inspiratory attempt or '*pūraka*' should coincide with the practice of Mūla-Bandha, consisting of the contraction of the levator ani, shifting up the rectum and its adnexa. The controlled suspension of breath or '*kumbhaka*' is to coincide with Jālandhara Bandha, chin pressing against the chest, just below the jugular notch to bring about a firm compression on the two carotid sinuses. The controlled expiration or '*recaka*' should proceed along with Uḍḍi-yāna Bandha or retraction of the abdominal wall, esp. the part below the navel,—following the 'flying up' of the diaphragm,—and so on with every cycle. From this description, it will be seen that the stress in Prāṇāyāma does not seem to be so much on the oxygen-value nor on the depletion of carbon dioxide, but on the manipulation of intra-pulmonic, intra-thoracic, and intra-abdominal pressures and retention of the same pressure-changes for a particular length of time.

Thus, inspiration, retention and expiration, all these are to be gone through in Prāṇāyāma in a controlled manner, each phase lasting for several seconds. This temporal factor, *i.e.*, prolongation of a particular phase for a considerable length of time is of primary importance not only in Prāṇāyāma but in almost all Yogic exercises. Tradition has fixed a definite proportion of time limit to each of the three phases of Prāṇāyāma. The purpose behind this seems to be to provide one with some means to measure one's capacity so that one may not transgress one's own limitations and wreck the delicate and vital mechanism of respiration and through it the whole organismic function.

The whole technique of Prāṇāyāma is a very complicated one. There are specific rules regarding the method of breathing, the force of breathing, the duration of each phase of breathing, attention and concentration on certain points in the body during the process of breathing, etc. All these are intended for the serious students of Yoga and may not be given at length in a book on Yogic Therapy. We shall only deal with certain broad characteristics of Prāṇāyāma in general.

(Contd. from page 40)

(B) Capacities : Each of these includes two or more of the primary volumes given above.

- (1) Total Lung capacity—(formerly total lung volume) is the amount of air in the lung after maximal inspiration.
- (2) Vital capacity—is the maximal volume of air that can be expelled from the lungs by a forceful effort after a maximal inspiration.
- (3) Inspiratory capacity—(formerly complemental or complementary air) is the maximal volume of air that can be inspired from the resting expiratory level.
- (4) Functional Residual capacity—(formerly functional residual air, equilibrium capacity or mid capacity) is the volume of air that remains in the lungs at resting expiratory level.

(The resting end-expiratory position varies less than the end-inspiratory position. Hence the former is used as a base line in preference to the latter.)

Methods of Prāṇāyāmic Breathing

Before we start dealing with methods of Prāṇāyāmic breathing, let us note the common types of ordinary breathing.

There are generally three types of breathing that are recognised as such, though there is no water-tight differentiation in them. These are : (1) Thoracic breathing, wherein only the chest is raised, the abdomen is kept quite controlled and the excursions of the thoracic diaphragm are minimal, (2) Abdominal or Diaphragmatic breathing, where the abdominal wall takes a prominent part, distending during inspiration and retracting and contracting during expiration. In this the excursions of the thoracic diaphragm are at their maximal, (3) Thoraco-abdominal—this is a combination of the two; first the chest is raised and when it seems full, the diaphragm also is lowered to the fullest extent distending the abdomen. The expiratory process is started the other way, *i.e.*, the abdominal wall contracts and retracts throwing the diaphragm up. When this is done to capacity, the chest heaves down and empties itself completely.

Ordinary breathing lies somewhere in between these three, according to the habit and training of the person as well as sex. Females are supposed to resort to thoracic breathing normally and males to abdominal.

Prāṇāyāmic breathing is very different from all these. The one significant feature of Prāṇāyāmic breathing is the *stress* that is laid on *the pelvic diaphragm*. This seems to have a direct bearing on the residual volume of lungs. It is interesting to note that in a recent study carried out on the pulmonary functions of paraplegics at the Long Beach Veterans Administration Hospital by Dr. Allan Hemingway *et al*, it was found that all the paraplegics had elevated residual volumes, much more than those of the controls. This did not seem to be dependent on the extent of respiratory muscle paralysis. The only paralysis that was common to all the three groups of paraplegics [with (i) lumbar, (ii) thoracic, and (iii) cervical lesions] was the paralysis of lower limbs and pelvic floor muscles. Moreover, the paraplegics led a sedentary or supine type of living while the experimental controls were working actively. This led the investigators to offer only one explanation for the finding, rather reservedly, and that was, that this might be due to the paralysis of the pelvic floor muscles which normally support the abdominal viscera. They postulated that this paralysis of the pelvic floor caused the thoracic diaphragm to descend and this increased the residual volume. In the words of the investigators, “if this occurs, it imparts to the pelvic floor more of supporting role for the viscera than is generally believed to occur.” (Italics ours).

The foregoing finding, if confirmed, should prove to be of great significance, for, in no book on Respiratory Physiology is the role of the pelvic diaphragm in

breathing stressed so. There is not even a mention made of the pelvic floor in these books while dealing with the mechanics of respiration. When one of the authors of this pamphlet was engaged in treating emphysematous patients in the Long Beach Hospital, he happened to bring this fact, viz., the significance of the tone and action of the pelvic floor and its effects on residual volume, to the notice of Dr. Allan Hemingway, who at once corroborated the author's views and cited their own above investigation in support. It was then planned to take up this specific matter for further investigation, viz., the role of the pelvic floor in respiration. It was unfortunate, however, that the author could not continue his stay there longer to be able to proceed with the work. But it will be taken up soon and the authors are confident that they would easily be able to confirm their contention that the pelvic floor has a significant role to play in the respiratory process as it remarkably affects the residual volume.

This discussion was found rather necessary to bring home to the readers the importance of Mūla-Bandha in Prāṇāyāma from the point of respiratory physiology. Now to start with the technique of Prāṇāyāmic breathing:

Prāṇāyāmic practices mostly consist of three phases, at times, of four. These are :

- (i) 'Puraka' phase—i.e., controlled inspiratory phase, as against 'śvāsa'. which term is used for the uncontrolled normal automatic process of inspiration. Though 'purakas' are mostly practised slowly with an eye on prolonging their duration and decreasing the inspiratory force (these two being inversely proportional), there are some Prāṇāyāmas, wherein one is required to do the other way, i.e., breathe in very rapidly, as also breathe out rapidly, the whole cycle taking nearly half a second, as in the first stage of Bhastrikā.
- (ii) 'Kumbhaka' phase—This term is applied to the phase of controlled suspension of breath. [There is no word in usage in Sanskrit for the automatic temporary suspension of breath that generally occurs when one is surprised (startled) or overcome with strong emotion, as also when one is engaged in heavy work].
- (iii) 'Recaka' phase—This is the phase of controlled expiration maintaining certain duration and inner pressure. The term 'praśvāsa' is used for the normal automatic exhalation. Generally, one is recommended to give this phase double the time, double that of the time given for inspiration. There are occasions, as indicated above, when one is required to breathe in and out rapidly, e.g., first stage of Bhastrikā.
- (iv) 'Śūnyaka' phase—This is suspension of breath after full expiration. ('kumbhaka' and 'śūnyaka', are also sometimes called 'pūrṇa' or 'ābhlyantara', kumbhaka and 'śūnya' or 'bāhya' kumbhaka respectively.)

YOGIC THERAPY

The first thing to be taken care of is the position of pelvis, the back and the neck. All these are maintained in an 'erect' position,—the pelvis remaining at an angle of about 30°. It is for this reason that certain special Āsanas like Siddha, Padma, Svastika, Sama are prescribed in Yoga for Prāṇāyāma. These help to keep the pelvis at the requisite angle easily and thus facilitate the formation of Mūla-Bandha. *The pelvic inclination has a great bearing on the tone of the pelvic floor.*

1. After taking up the right position, one begins to breathe in slowly raising the clavicles (collar bones) and the upper part of the chest and at the same time contracting and raising the pelvic floor too gradually, [See fig. 6(b)].

2. When one has raised the upper chest to capacity, one then resorts to widening the middle portion of the chest, consciously trying to expand the ribs to their maximum capacity. Raising of the pelvic floor is maintained steadily during this process too and air is sucked in very slowly [See fig. 6(c)].

3. This done, one then tries to consciously heave the thoracic diaphragm down, [this makes the pit of the stomach (epigastrium) have a fullness about it] and try to take in as much air as one can. The pelvic floor is being raised all this while and this contributes to a retraction of the lower part of the abdomen below the navel—the region known as the '*uḍḍiyāna peetha*'. When this is further contracted it forms what is known as Uḍḍiyāna-Bandha (See fig. 6(d)).

These three steps form the '*pūraka*' phase of Prāṇāyāma, i.e., controlled 'breathing in'. They have to be gone through in a gentle rhythmic manner and not in jerks. This is followed by the '*kumbhaka*' phase, that is, phase of retention. While retaining the breath (i) one keeps the lower abdomen retracted, (ii) tries to pull the pelvic floor as high as possible, (iii) proceeds to press the chin into the jugular notch, thus compressing the carotid sinuses, and (iv) one is also advised to glide the tongue backwards over the roof of the palate and press the base (hind-part) of the tongue against the pharyngeal wall. This too exerts a strong pull upwards on the upper part of the neck and helps to compress the carotid sinuses all the more. These are known as Uḍḍiyāna Bandha, Mūla Bandha, Jālandhara Bandha and Jihvā Bandha respectively. When the chest is full and subjected to internal pressures this way, there is a slight tingling sensation all over the body—'in the region of hair follicles', as Yogic texts describe it: the digits especially are 'filled with blood' as there is a capillary dilatation and the volume of pulsation increases in them. One is asked to continue holding breath till one feels these sensations ('*ā keśād ā nakhāgrācca nirodhāvadhi kumbhayet*').

Fig. 6 (A)
Stages in Prāṇāyāma (see text)



Starting Position



Fig. 6(c)

Expanding mid-portion of Chest

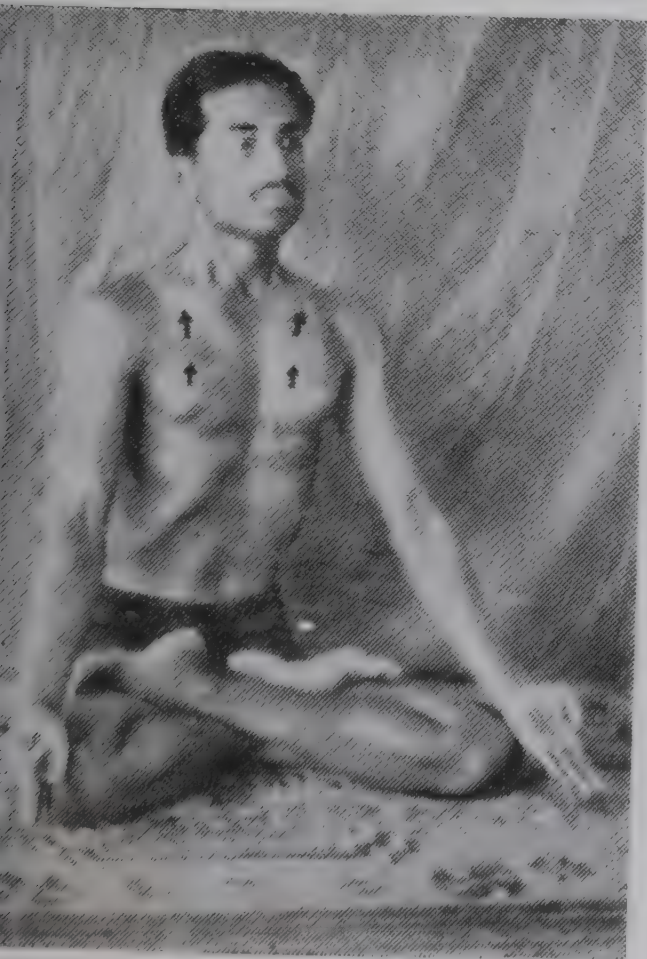


Fig. 6(b)

Raising clavicle and pelvic floor

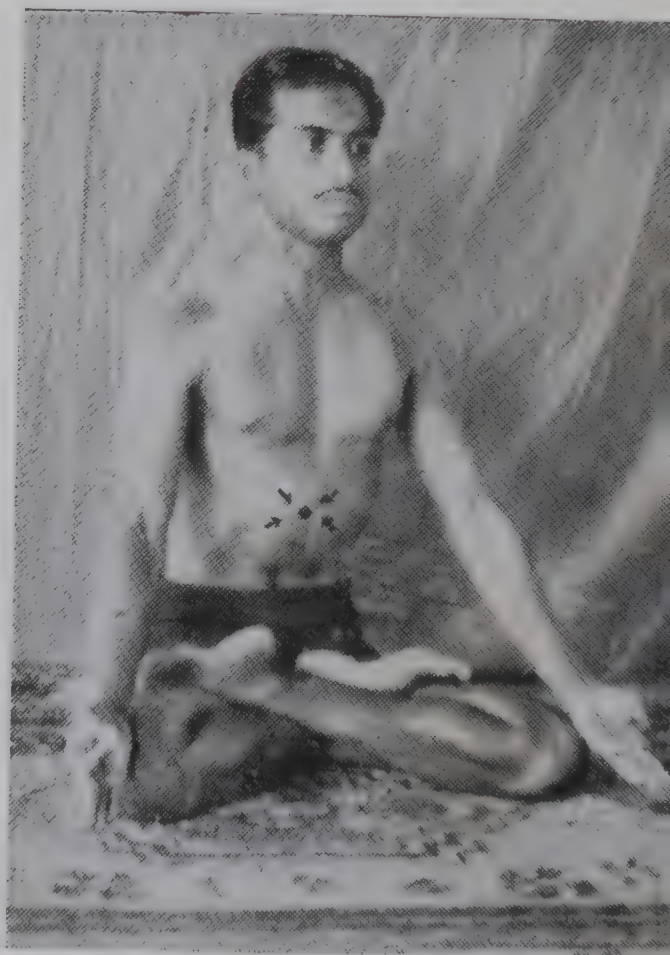


Fig. 6(d)

Pit of the stomach

The compression exerted on carotid sinuses prevents any undue rise of blood pressure, which, otherwise, is to be expected when breath is held so fast and under such high internal pressure. Failure to compress the carotid sinuses adequately does give rise to an abnormally high heart rate and rise in blood pressure. Carotid sinuses have been known in modern physiology as very sensitive baro-receptors which help to regulate respiration, heart rate and circulatory pressures.

The carotids—especially carotid sinuses—are called '*vijnānā nāḍī*'s, in yogic literature, *i.e.*, the nerves (sinus nerves) that help one to retain consciousness and power to 'experience'. It is interesting to note that this is just the opposite of the meaning of the word 'carotid'—'stupor producer'. The carotid sinuses would produce a stupor only when they are compressed hard and for a long time, but that is not what they do normally. In fact, the internal carotids help retention of consciousness by feeding the brain with the requisite amount of blood, and hence they are not 'stupor producers' but 'consciousness producers'. It is well-known that the brain requires a very high amount of oxygen and glucose for its functioning, and both these are supplied by the carotids. So the Yogic terminology for them seems to be more correct ! It seems, the ancient Yogins also knew about these other physiological effects of carotid sinuses, since they have taken a judicious advantage of them in regulating their blood pressure and heart rate while retaining breath. They also used it in Yogic Therapy to help relieve patients with high blood-pressure by prescribing what they called '*vijnāna nāḍi mardana*', or massage of carotid sinuses, and also used them to create an obliviousness of external world ('*mūrchā*') by resorting to breathing while maintaining such high compression on the carotid sinuses (called '*mūrchā*'-Prāṇāyāma). This is only to show that the Jālandhara Bandha is not just to help a person hold his breath by a 'kink' of the neck, but has a definite physiological purpose which was understood by the ancients.

The breath is retained, thus under high compression, as *comfortably* long as possible. It is thought that the ideal duration for a person is such as would allow him to comfortably give double the time to expiration—double that of his inspiratory duration. The purpose behind this seems to be, as said above, only to see that one does not *tax* the delicate respiratory centres beyond their capacity. They are to be gradually acclimatised and trained to withstand higher and higher CO₂ tensions, so that, in the longer run, the automatic chemo-receptive regulation is brought under greater and greater volitional control, and one can bring into play the baro-receptors of the respiratory system and especially the stretch-reflexes. The idea behind this all seems to be to bring about an automatic arrest of respiration. It has been found by Barach that when the stretch-receptors of the alveoli are sufficiently stimulated, the proprioceptive effect leads to a prolonged arrest of respira-

tion. This is what seems to be aimed at in these Prāṇāyāmic practices. The insistence on the various 'bandhas' and development of such a high intra-pulmonic pressure leads one to conclude so. Why they wanted such an arrest of respiration we shall come to when we deal with the higher neuro-physiological aspects of Prāṇāyāma, again in the light of Patañjali's aphorisms on the topic, as we did in the case of Āsanas.

The durations of each phase of Prāṇāyāma are not uniform to all traditions. Most of them, however, stick to the proportions of 1:4:2, *i.e.*, giving four times as much time to retention and double the time to expiration—the standard for measure being one's inspiratory duration. It should be stressed, however, that no phase should be allowed to lead to a feeling of distress. There should be no feeling of 'air hunger' at any stage during not only one round of Prāṇāyāma but throughout the whole practice of Prāṇāyāma. If one feels even the slightest distress or air-hunger at any of the stages, one must *at once* reduce the whole gamut of the proportions by decreasing the time for inspiration adequately. It should be borne in mind that the respiratory mechanism is a very delicate one and there is an extremely sensitive threadbare 'balance-wheel' in the form of a special respiratory centre in the medulla for its regulation. Any wanton tampering with the same will lead to tragic results; one may become a physical or psychological wreck for all times. Since 1:4:2 proportion is rather drastic, some advocate the development of it gradually, *i.e.*, from 1:1:2 through a slow and gradual development to 1:4:2. Others have advocated a proportion of 6:8:5, on the authority of Gorakṣa Saṃhitā, as safe and convenient for beginners. These proportions can be easily achieved through mental counts, use of a rosary or a 'mantra' (a sacred formula) or better, with the help of a watch. So much for the duration of each phase of Prāṇāyāma. We *felt* we should deal with it when we talked of the retention phase only, because it was this phase that was by far the most important in Prāṇāyāma.

After retaining the breath, as above, in a comfortable manner, the third phase,—of '*recaka*' or controlled expiration,—is started. This phase too is gone through stage by stage, in a smooth rhythmic way.

Thus, (1) the chin-lock is released and the head raised; the abdomen is contracted and retracted gradually and, as one does so, the diaphragm is allowed to be pushed up by the increasing intra-abdominal pressure (hitherto it was resisting that pressure). The pit of the stomach is seen to hollow out gradually [See fig. 6(e)].

(2) Next, the ribs start contracting and the basal portion of the chest narrows down.

Fig. 6 (B)



Contracting and retracting abdomen and raising diaphragm.

Fig. 6(e)

Heaving the chest down and relaxing abdominal wall.



Fig. 6(f)

(3) Lastly, the raised chest wall is allowed to heave down slowly and expiration is carried out to a point when one feels one can breathe out no more [See fig. 6 (f)].

(4) All along, the pelvic floor was kept high and abdomen was kept retracting. Now the abdominal muscles are relaxed, and when the diaphragm remains raised and the abdominal wall is relaxed, there develops a sudden concavity in the abdominal region. If the pull on the lower abdomen is maintained, there is a decided hollow (in the case of supple people) in the hypogastric region, a few inches below the navel. This is Uḍḍiyāna Bandha in '*recaka*'. This forms the phase of '*śūnyaka*' or '*śūnya*' *kumbhaka*. It is kept for a few seconds and then the pelvic floor is relaxed.

Another peculiarity of Prāṇāyāmic breathing is the significance it attaches to breathing through right and left nostrils. It may have been noted by many that most of the time, the right and left nostrils do not work evenly. One of them remains more or less congested while the other works freely. According to Yoga, this is not a chance happening but there is a physiological purpose behind it. [It has been known to modern physiology that the body tries to adjust itself to environmental temperature changes, etc., through alternate vaso-dilatation and vaso-constriction. This is more marked in the extreme terminals of the body, *e.g.*, tips of fingers, toes, etc. Abramson and others have employed plethysmographic techniques to measure volume changes in an extremity or digit. It has been established by them that in a normal person who is exposed to usual environmental temperatures, there is a continuous cyclic variation in vaso-motor tone every 15 to 60 seconds. These changes are reflected in limb volumes and are more marked in digits, and least in proximal portions of the extremities. (*Vide* Abramson, D.I.—'Vascular Responses in the Extremities of Man in Health and Disease',—University of Chicago Press 1944¹.) Nose may also be such a terminal point. But in the nose, somehow, it is not both the nostrils that are affected at the same time. Yoga has a different explanation for this.] It is its contention that while the left nostril dissipates more heat through its breath, the right one conserves it. And, normally, a healthy body adjusts itself by opening up, *i.e.*, constricting the capillaries of the mucous membrane of one nostril, and blocking, *i.e.*, dilating the capillaries of the mucous membrane of the other. In order to maintain good and sound health, according to Yoga, these two nostrils should work judiciously and open up in equal manner. This is an ideal state. As they do not do so, however, in the case of most persons, Yoga prescribes what is known as 'Alternate Breathing' or '*anulomaviloma*' Prāṇāyāma, *i.e.*, one breathes in, in the regular Prāṇāyāmic way described before, but only through one of the nostrils, shutting out the other, (usually one starts with the left nostril), holds the breath for a time in the prescribed

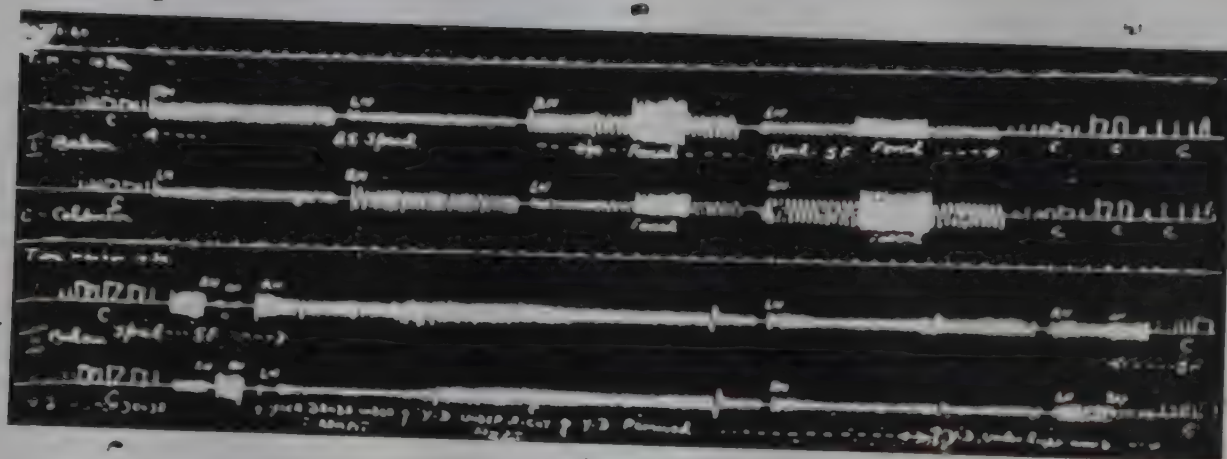
fashion, and then breathes out through the opposite nostril in the same usual Yogic technique described heretofore. The second round is followed the opposite way, *i.e.*, one breathes in through the same nostril that one has just used to breathe out and uses the other nostril for expiration. Such rounds are repeated a number of times (21 to 120) per day. This type of Prāṇāyāma is mostly supposed to bring about a homeostatic equilibrium in the body. It is also called '*mala-śodhaka*' Prāṇāyāma, *i.e.*, one that cleanses or eliminates the '*malas*' ('*ma'a*' is a term used in Yogic literature for all factors that give rise to an imbalance in the body or mind. Thus, we have '*śarīra-mala*'s—factors that affect the body and spoil its health, and '*citta-mala*'s—factors that give rise to mental disturbances).

Many Yogins are not satisfied with such mere alternate breathing. They insist that the two nostrils should be made to work evenly, *i.e.*, there should be blockade of no nostril, when one starts these Prāṇāyāmic exercises. It is only then, they say, that one can get the best results claimed for them by Yoga. To open up the nostrils, they take the help of a contrivance called '*Yoga-danda*' ('*Kubaḍi*' in Northern Indian languages) (No. 10 Fig. 9). This is a short crutchlike stick, about two and a half feet high, which is used to press upon the arm-pits, just as a lame man would use a crutch. The arm-pit opposite to the blocked nostril is subjected to this pressure. One just sits with the 'crutch' in the arm-pit, supporting oneself to some extent on the same. And this does work, *i.e.*, does open up the opposite blocked nostril within a few seconds.

The whole problem is being taken up for investigation in the kaivalyadhama laboratories. It is too early to say anything definite in the matter. That there is a usual blockade of one of the nostrils and that this blocked nostril does open with pressure exerted on the opposite arm-pit has been confirmed a number of times in the laboratories. (Fig. 7). To modern physiology, even the alternate blockade of one of the nostrils is something new. And, there is, at least for the present, no anatomico-physiological explanation for the phenomenon, but, we believe, it must have something to do with sympathetic innervation. We have, however, good clinical evidence to surmise that this 'alternate breathing' may help to some extent in bringing about a 'balance' in the system, and hence we have made ourselves bold to refer to this form of traditional Yogic breathing method.

We have described above the general routine followed in the practice of Prāṇāyāma. As said initially, there are a great many varieties of Prāṇāyāma with different techniques for each. Several claims are made about their specific results. In a general book like this we do not propose to go into all of them. We can recommend here one variety as the most useful and harmless one, and that is Ujjāyī.

Fig. 7



YOGA-DANDA EFFECT

A kymographic record to show how a partial congestion in one nostril can be relieved in a matter of a few seconds by exerting pressure on the opposite arm-pit. In the above record, both pens have been arranged to give equal calibration. Left nostril shows partial blocking. This is confirmed by changing the pens, both for ordinary and forced breathing. Then the Yoga-Danda is placed under the left arm-pit, *i.e., on the same side*. There is practically no effect on the left nostril *but* the opposite open one is showing a tendency to get blocked slightly. The Yoga-Danda is then shifted to the opposite arm-pit. The result is almost immediate as can be seen in this record. The left nostril has opened in about 25 seconds and the pressure exerted by the breath from the two nostrils is almost equal. Even when the Yoga-Danda is removed, the pressure of breath remains equal for a long time, but again the right nostril is showing partial congestion this time. Yoga-Danda kept in the arm-pit *on the same side* has again failed to produce required effects.

UJJĀYĪ PRANĀYĀMA

Every 'pūraka' including the first, is to start after complete exhalation. In Ujjāyī, breath is to be drawn in through both the nostrils. In drawing in the breath the work is to be done with the chest. The student is to expand it and the air will automatically rush in. Throughout the inhalation, the glottis is to be partially closed. This partial closure of the glottis will produce a continuous sound like the one that it is produced in sobbing. The difference is that in sobbing the sound is abrupt and broken. Here it is continuous. At the time of inhalation the facial muscles or the muscles of the nose should not be contracted. The contraction of facial muscles is of absolutely no use in inhalation. Some people are in the habit of making ugly contortions of the whole face, when they try to inhale. This is to be completely avoided.

As described initially, special care is to be taken of the abdominal muscles. They should be kept under proper control with a very slight contraction which is to be maintained throughout the inhalation. The Western physical culturists advise their followers to draw out the abdomen at the time of inhalation. In our opinion this is due to some wrong conceptions about the physiology of deep breathing. They appear to be under the impression that they can admit a larger quantity of fresh air and consequently of oxygen, if they were to draw out their abdomen. But in the laboratory evidence that we have collected in the Āśrama we have found this to be an error of judgement. The fact is that the controlled abdomen allows at a time more oxygen to be inhaled than the protracted abdomen. So far as the culture of the nerves is concerned, controlled abdominal muscles have got a decided advantage over protracted abdominal muscles in which condition they are kept relaxed. We do not say Prāṇāyāma, but purposely use the words deep breathing. The physiological effects of Prāṇāyāma are vastly different from those of deep breathing. It is, therefore, wrong to use the two words as equivalents of each other.

The whole course of inhalation must be smooth and uniform. The accompanying sound due to the friction offered by the partially closed glottis, should also be of a low but sweet and uniform pitch. All friction in the nose, especially in the olfactory region, should be cautiously avoided. It is this friction that is very often responsible for the disorders of the brain at times arising from wrong methods of Prāṇāyāma. When the limit of inhalation is reached there should be no conclusive effort at snatching an additional breath. No amount of muscle twisting will draw in even one more cc. of air.

The practice of 'kumbhaka' with the simultaneous exercise of all the three Bandhas is highly dangerous, if done without proper care and caution.

YOGIC THERAPY

No student of Yoga should indulge in this exercise without the help of an expert. We would, therefore, strongly advise our readers to start only with 'pūraka' and 'recaka', the respective durations being in the proportion of 1:2. The physical culturist can get all the advantages he wants to derive from Prāṇāyāma, by the practice of 'pūraka' and 'recaka' only. Even a spiritual culturist can make a good deal of progress without the practice of 'kumbhaka'. So there should be absolutely no hurry about taking to 'kumbhaka'. When 'kumbhaka' is started, it should be very slowly and cautiously developed. 'Kumbhaka' is the one thing in Prāṇāyāma which demands the utmost attention on the part of a student of Yoga. This statement is made after prolonged study of facts not only in our wide curative and preventive practices of Yogic Therapy, but also after a large number of experiments in the laboratory. We have a number of 'sādhaka's under training with us. It has been almost invariably observed that activity in some of the most important 'cakra's can be started simply by the practice of 'pūraka' and 'recaka' without taking to 'kumbhaka' at all. Of course, for further developments, 'kumbhaka' looks to be essential. If, however, it is developed with due caution and care, there is nothing dangerous about it or about Prāṇāyāma as a whole.

The duration in Prāṇāyāma should be judged mentally. Both, the physical culturists and the spiritual culturists, should practise Prāṇāyāma with utmost concentration. The mind should very closely follow the movement of breath. In numbering the 'mātrā's the concentration on the breath is many a time disturbed. Again, the spiritual culturist, as he advances, is required to concentrate upon different points either inside the body or outside it. In this work of numbering the 'mātrā's, a little distraction is caused. Those that can manage the numbering business without allowing their concentration being affected, may take to it if they so choose.

'Recaka' is to be done through the left nostril. At no stage during 'recaka' should the student lose his control over the lungs. The relaxation of the chest should be slow and uniformly progressive to the end. The glottis should all along remain partially closed. The frictional sound, due to this partial closure, should be of a low but uniform pitch.

From the very beginning of 'recaka', the abdominal muscles should undergo greater and greater contraction. Even when the chest shrinks to its lowest size, the abdomen should continue to contract, till the last cc. of the expiratory reserve is expelled. This does not mean that, in 'recaka', any amount of strain can be put upon the system. It only means that the exhalation should be as thorough as can be secured without involving any undue strain. Our readers may, however, note here that in 'recaka' there is less possibility of unduly straining oneself than in 'pūraka' and 'kumbhaka'. There

is another point of difference that deserves attention. In the case of an average man of health, 'pūraka' and 'kumbhaka', if developed beyond the right proportion, are likely to damage the lungs more than the heart; whereas an unduly deep 'recaka' is likely to affect the heart more than the lungs. The 'recaka' should always take a longer time than 'pūraka'. The orthodox proportion between pūraka and recaka is 1:2. An attempt should be made to reach this standard. Here again, one has to bear in mind that 'recaka' should never be so prolonged as to make the following inhalation any way hurried. In fact, in fixing up the proportions of the three component parts of a Prāṇāyāma, that is, of 'pūraka', and 'kumbhaka' and 'recaka', one has to see that one can perform with comfort, not only one Prāṇāyāma, but all the successive Prāṇāyāmas also. If at a sitting one wants to go through, say, fourteen rounds of Ujjāyī, one should never feel the need of snatching a normal breath in between any two successive rounds, till all the rounds are finished. No undue sense of suffocation should be experienced at any stage in the practice of Prāṇāyāma, whatever the number of rounds that one wants to have at a time. Necessary care is to be taken not only in fixing up the component parts of a single round, but also in fixing up the total number of rounds one wants to go through at one sitting.

Prāṇāyāmas are of primary importance in Yoga. So much so that many authorities on the subject, as can be deduced from the traditional texts of Yoga, felt that no other practice was necessary for attaining purification of body and mind. ("*prāṇāyāmaireva sarve praśuṣyanti malā iti, ācāryāṇāntu keṣancid-anyat-karma na sammatam*"-H.Y.P. III-37., i.e., 'Prāṇāyāma, by itself, is sufficient for the eradication of all 'mala's or 'toxins'. So opine some authorities who feel that no other practice is necessary'.) The import of this statement can be realised when we view it from the angle of the interoceptive-tonic reactions, discussed heretofore. We have to bear in mind that the alveolar surface of the lungs presents by far the vastest interoceptive area. That together with the bronchioles, bronchi, trachea, larynx and the nose, would form the best medium to attain a fluid 'postural substrate' which is essential for maintaining a homeostatic balance. The prime importance given to Prāṇāyāmas in Yoga can be understood when one realises how the interoceptive-tonic reactions, working through the respiratory mechanism have a special significance in maintaining this fluidity of postural substrate. The innervation of the respiratory system involves a distinct higher level of nervous activity. It is now recognized and established that the controlling areas of respiration are not only in the medulla and pons, but many other central regions, higher than the hypo-thalamic level, like the medial and basal cortical and sub-cortical areas, have been found capable of exerting influence on respiratory functions. Thus, even on neuro-anatomic grounds, one could expect a possibility of an integration of autonomic 'and cerebro-spinal impulses (of the so-called 'involuntary' and 'voluntary' nervous mechanisms) through the control of respiration. Even otherwise, respiration often constitutes

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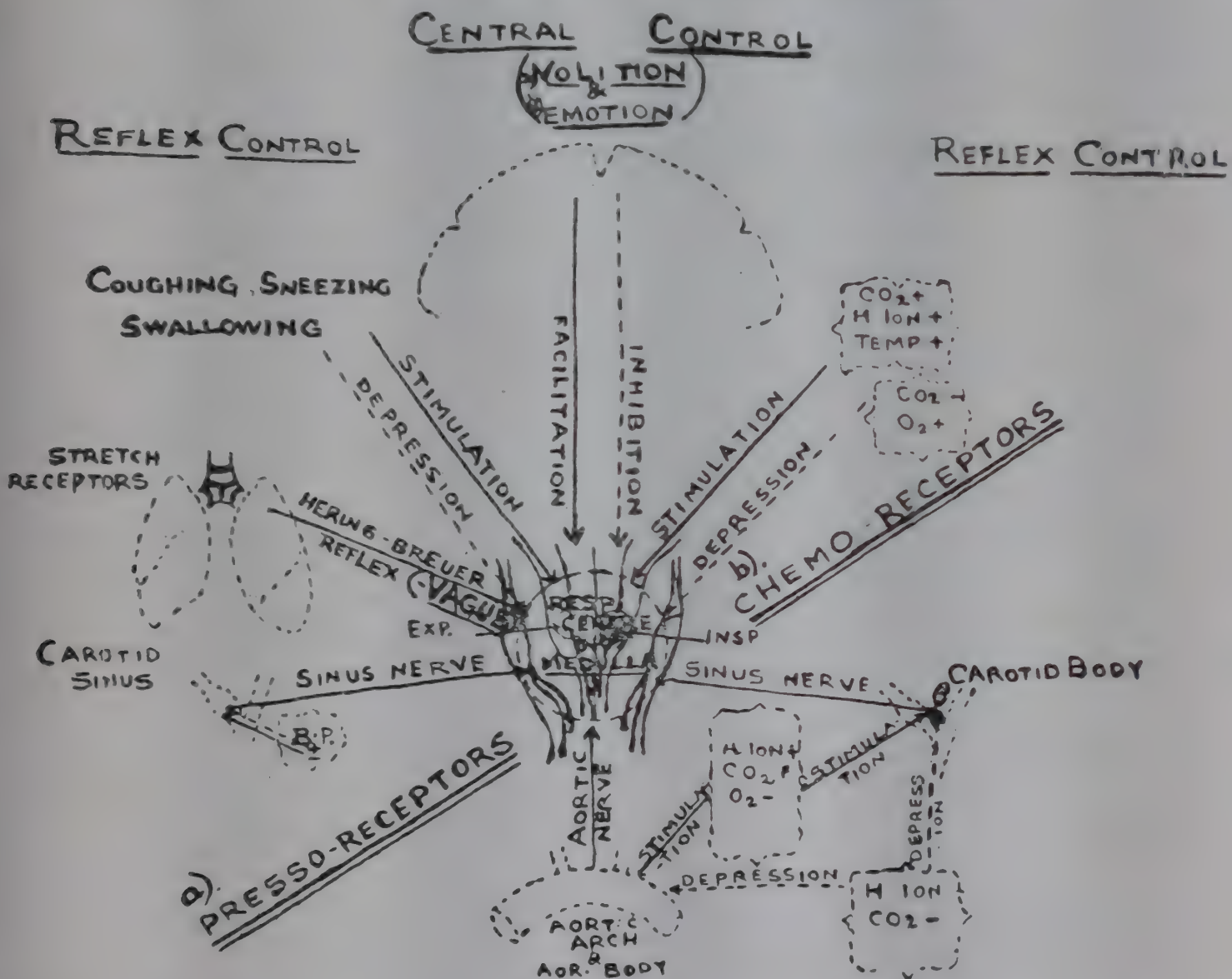
SR 9

a rough indicator of different behaviour constellations in the general animal world. The relation of respiration to behaviour and its disorders is being recognized more and more in the scientific world today. Various investigations have been carried out and a good amount of experimental data collected regarding modifications of breathing in attention, mental effort and in various emotional and other behaviouristic action patterns. In this connection, it will be of interest to observe that somatic conditions like pulmonary tuberculosis and asthma have often been associated with personality conflicts and such conflicts are now being presumed to be important factors in the onset and course of these diseases (*Vide* Brown, Lawranson, 'The Mental Aspect in the Etiology and Treatment of Pulmonary Tuberculosis'⁶, International Clinics, 1933, Vol. III-pp. 149-74, and French, Thomas & Alexander Franz 'Psychogenic Factors in Bronchial Asthma' part I, 'Psycho-Somatic Medicine' Monograph IV-1941¹¹, p. 236). Unfortunately, however, while meticulous observations and experiments are being made to assay the effects of psychogenic factors on respiration, the reverse process, *i.e.*, the effect of respiratory modifications, especially of controlled respiration, as advocated in Prāṇāyāma, on the psychological substrate of man is not being investigated with the same care and caution. What little work has been done in the West so far on the effects of respiration seems to have been carried out only on breathing exercises of forced deep inspirations and expirations, and there too, mostly on the biochemical changes brought about in the various systems thereafter. No attention has, as yet, been given to the interoceptive-tonic reactions of respiration, that we have stressed here, except by Dr. Barach, whose work we have already cited. The Prāṇāyāmic respiratory exercises, that are so different in their mechanism and effects, have not been recognized as such in the West, and hence they have not been tackled at all there. What little experimental work has been done on them has been in the Kaivalyadhama laboratory, Lonavla; but here too, so far, it has been only on their biochemical aspects, confirming thereby that the findings on the biochemical effects of forced breathing are not applicable to Prāṇāyāmic exercises. The special claim of Yoga regarding the beneficial influence of Prāṇāyāma, both on the internal as well as external behaviour patterns of man, still remains to be investigated scientifically.

The ancient Yogins, in fact, seem to claim for Prāṇāyāma results that are still greater. Prāṇāyāma, they seem to plead, not only contributes to 'nāḍisuddhi' but can effect a change in the very pathways of the impulses through the brain, resulting into a constant steadiness and balance of mind. (*'vidhivat prāṇasamya mairnāḍickre viśodhite suṣumnā-vadanaṃ bhityā sukhād viśati mārutaḥ : mārute maḍhiyasancāre manassthairyaṃ prajāyate'*),—'By Prāṇāyāmas, that are practised correctly, the whole of the nervous system is well integrated and then the impulses run easily through the 'suṣumṇa'—the central tract—after clearing away the occlusion that had erstwhile blocked this pathway. The impulses coursing

PRANAYAMA

REGULATION OF RESPIRATORY CENTRE. (A SCHEMATIC REPRESENTATION.)



These factors regulate respiration. Prāṇāyāma makes use of them all in preparing for it, a sedation of emotional tensions is a pre-requisite. During practice, volitional control is used to gradually train the respiratory centre to withstand a wider and wider range of chemical changes in blood, and, at the same time, take the judicious help of presso-receptors to bring about a total arrest of respiration—'Kevala-Kumbhaka'; this is claimed to 'drop the curtain' that is drawn over the Light—i.e., over an intuitional apprehension of Reality ("tataḥ prākāśavarana kṣayaḥ"). How this seems theoretically plausible is explained in the text (Page 54). Prāṇāyāma greatly helps to bring about nerve sedation.

thus through the central pathway give rise to a steadiness (and balance) of mind.' (H.Y.P. II-41-42).

The circuit of these impulses, they say, normally runs through the 'lateral regions' and this course of it gives rise to ego-centricism and unsteadiness of mind. If, instead, the impulses were to course through the 'central circuit', that would contribute to peace and mental balance. Then, the mental energies could be controlled easily and canalized for higher ends. Normally, however, this central path remains occluded by '*kapha*', but *Prāṇāyāma*, especially its *Bhastrikā* variety, helps to break these 'obstructions' and render the passage free, i.e., it helps to activate the same. ("*brahma-nāḍi-mukhe sams-thakaphādyargalanāśanam bhastrākhyam kumbhakam tvidam*" H.Y.P.II-65-66). Once this central circuit is opened, gradually it becomes more and more established, with the result that there is more and more steadiness of mind.

It will be of interest here to note that, recently, Dr. Heath of the Tulane University, and his colleagues working on the problems of schizophrenia, have postulated a similar hypothesis of two separate circuits in the brain: (1) a facilitatory circuit coursing through the septal region, and (2) an inhibitory one, working through the lateral regions. A good deal of work is being done in the Tulane University Department of Psychiatry and Neurology to develop this theory, the reasoning for which has been presented in detail by them in a Departmental Monograph, entitled 'Studies in Schizophrenia; a Multi-disciplinary Approach to Mind Brain Relationship' (Harvard University Press : 1954)¹⁷. The hypothesis is being tested on human beings, who could 'talk out their minds', with electrode implantations in sub-cortical regions for over a year and stimulation of these regions through deep leads. This latter technique, however, is still crude, according to them and not very satisfactory. Yet, the work done so far has been enough to indicate a possibility of the two circuits postulated by them.

The 'Central Circuit' implied by our ancient Yogins may not exactly be the septal one. (They claim that along with the activation of the 'central circuit', there is also a cessation of breathing).

To be more exact, the ancient adepts in Yoga postulated two latent brain circuits in human beings, (1) Central Circuit—'*madhya patha*'—and (2) Superior Circuit—'*ūrdhva-patha*'. '*Samādhi*' stage is supposed to set in when the latter is activated. It is very difficult to locate these on mere neuro-anatomical grounds.

Yet, if we take into consideration the supramedullary pathways of respiratory innervation, the empirical claim of these adepts that *Prāṇāyāma* can activate new circuits of impulses seems to be quite plausible. It has, however, to be put to a very severe test and investigation, and the method of a multi-disciplinary

YOGIC THERAPY

approach, that is followed by the Tulane University group of scientists, if applied to the investigation on some advanced students of Yoga, should perhaps be expected to go a long way to test and explain in a rational way the claim made by the ancient Yogic adepts.

Patañjali claims that judicious Prāṇāyāma can break the barriers that are responsible to keep us in the darkness, *i. e.*, it can open up the doors that would lead us to self-realisation. (“*tataḥ prakāśāvaraṇakṣayaḥ*”). We have already referred to the existence of supramedullary sub-cortical and cortical centres for the regulation of respiration (Fig. 8). One such centre that is found to arrest respiration is located near the tip of the temporal lobe. If, as in ‘*kevala kumbhaka*’, an arrest of respiration is brought about, it could be due to this centre. The tip of the temporal lobe is also found to contain the centre of ego-consciousness. Perhaps the nearness of these two centres makes Prāṇāyāma so important to the Yogins, for according to them, arrest of respiration also brings about an arrest of ego-consciousness, which latter is called the ‘seed’ of all the dichotomous ‘thinking or behaviour of man’ and the undue domination by this ego-consciousness is responsible for many neurotic conditions.

CHAPTER IV

OTHER YOGIC THERAPEUTICAL PROCEDURES AND YOGIC PRINCIPLES OF DIET

Other procedures of Yogic Therapy consist of various types of lavages and special acclimatisation processes. We shall deal with a few of the major ones here.

I. Naso-Pharyngeal Hygiene

(a) NOSE

Nose is the first gateway of the respiratory system. It is also one of the extreme terminals of the body like the ears and digits.

As pointed out in the previous chapter, in order to adjust the body to the environmental temperature changes, etc., the vasomotor system resorts to alternate vaso-dilatation and vaso-constriction. This is more marked in these extreme points of the body. Any derangement in the mechanism, such as, vaso-dilatation at the extreme ends and proximal vaso-constriction in arterioles and venules, gives rise to congestion. This would disturb the natural cycles of vaso-dilatation and vaso-constriction processes. This happens very often in psycho-somatic disorders, and a vicious circle starts from this point. The viri are always present in the air and they find a good nidus to settle and breed in these congested mucous membranes of the nose. Naturally, the membrane becomes more irritable, and there is an attack of sneezing and flow of exudate from the nose. This is nature's initial attempt to drive away the offending organisms. This would succeed only in case the irritation is temporary and the irritating factor is removable. But when the congestion persists, this natural process of eradication of the offending material fails, and the chronic congestion perpetuates a vicious circle, giving rise to what is called 'chronic rhinitis'.

The factors that affect the vasomotor cycles are: temperature and osmotic pressure changes, moisture contents of, and dust and other particles in, the air. The dust and other particles do not only irritate the mucous membranes but abrade them giving rise to superficial lesions. This and the congestive phenomena are the prime factors that predispose the mucosa to inflammatory reactions.

The rational method, therefore, of preventing this eventuality would be to acclimatise the nasal mucosa to these various factors. Yoga does this through a process consisting of what are called 'Neti' and 'Kapālabhāti'.

These days, the terms seem to have got mixed up. As the orthodox texts show, the more correct interpretation was that the term 'Neti' was to be used

only for the process whereby the mucosa would be rendered tough and resistant to frictional effects of dust and other particles. The term 'Kapālabhāti' was to be used for the cleansing of the mucosa with water and forceful currents of air. At present, however, the term Kapālabhāti seems to be used only for the latter process, *i.e.*, air cleansing, and the word 'Neti' is used to mean cleansing with water, as well as the frictional massage of nasal mucosa. Thus, we have, nowadays, (i) Jala-neti—cleansing of the nose with water, (ii) Sūtraneti—toughening and acclimatising the mucous membranes to dust, etc., with frictional massage, and (iii) Kapālabhāti—cleansing of nose and sinuses with air. These should be, according to orthodox texts—(i) Jala Kapālabhāti (ii) Neti and (iii) Vāta Kapālabhāti respectively.

(i) *Jala Neti (Jala-Kapālabhāti):*

The orthodox way of washing the nose with water is as follows :

(a) **Vyutkrama Kapālabhāti**—Water is taken in the hollow of the hand and held over the upper lip, touching the nose. The soft palate is pulled down, as also the mandible (jaw-bone). This ensures a sloping of the floor of the nose so that the water, when sucked, would flow only along the floor and not irritate the olfactory nerve-terminals above. The water is sucked into the mouth thus, and thrown out. The process is repeated twice or thrice. It is best to bend the head a little forward and downwards while doing this.

(b) **Seetkrama Kapālabhāti**—Clean and gargle the mouth once or twice. Then after taking a mouthful of water, adopt the same position of palate and the mandible as described above, *i.e.*, pull the soft palate and the mandible down. Then, bending a little forward and downward, blow through the nose, pushing, at the same time, the water backwards in the mouth by making the back portion of the tongue touch the hind part of the hard palate, as one does while producing a guttural sound. The water will flow out along the floor of the nose if one does this.

These two are the technical processes of orthodox Jala-Kapālabhāti or washing the nose with water.

A Modern Improvised Jala-neti :

(c) A novice may, however, resort to washing the nose with a feeding cup. It is best to choose one with a nozzle without a pout (No. 5 in fig. 9). One bends the head sideways and slightly down, inserts the nozzle of the cup into the upper nostril, opens the mouth and breathes out through it, as one pours the water into the nose. This will make the water flow through the other nostril, and some of it through the mouth as well, which could then be thrown out. The same process is repeated, bending the head to the opposite side and working through the other nostril.



THE OLD AND THE NEW

Accessories used in some of the Yogic practices

Danda-Dhautis	}	1. Adventitious root of a Banyan Tree (smoothened and made pliable by keeping in water over-night).
Old		2. Rib of Banana leaf (held over fire and made pliant).
New	}	3. An ordinary rubber tube (a yard long and of the thickness of one's finger). (Sterilised every time before use).
		4. A regular stomach tube (used in hospitals for stomach wash). (This too can be sterilised before use).
Netis	}	5. A feeding cup without a pout at the nozzle (used for Jalaneti or nasal douche).
Old		6. The old orthodox Sūtra-neti.
New		7. Its new improvisation—a urethral rubber Catheter, which can be sterilised before use.
Bastis Old	}	8. The old orthodox wooden 'Basti' Tube.
New		9. A modern rubber flatus tube used for Basti (can be sterilised).
Prāṇāyāma		10. Yoga-danda or Kubḍi used some times for Prāṇāyāma.

OTHER YOGIC THERAPEUTICAL PROCEDURES AND YOGIC PRINCIPLES OF DIET

A short note about the water used in these three processes :

The water is mixed with salt, the strength of the solution being varied from hypertonic to hypotonic. The temperature of the water too is varied from warm, (in fact bearably hot) to cold. To start with, however, one uses tepid water with normal saline. The strength of the solution and its temperature are then gradually raised to hypertonic and warm (hot) within bearable limits, and later, brought down to hypotonic and cold level, so much so that finally, ordinary cold water could be used for these purposes without irritating the mucous membranes of the nose.

The idea behind this whole process is not only to clean the nose but to acclimatise its mucosa to the various changes in the temperature and osmotic pressure of the environmental air. Such an acclimatised nose would naturally be able to adjust its vasomotor rhythm to inclemencies of weather.

(ii) *Sūtra Neti (Neti according to orthodox terminology) :*

The old orthodox way was to use a sheaf of cotton threads, about one and half feet long, the proximal one-third being twisted and dipped in hot bee-wax and cooled so that it is turned into a stiff, yet pliable, cord. This was called 'Sūtra Neti' or Neti, and rubbing and massaging the mucous membranes of the nostrils with this formed Neti Kriya or simply Neti. The lower two-thirds formed a long tassel or tuft of loose threads (No. 6, fig. 9).

The hard waxed tip was passed through one of the nostrils along its floor, adopting the same position of nose as described above, *i.e.*, pulling down the soft palate and the mandible. As the tip was felt at the back of the throat, the mouth was opened, and two fingers, preferably the index and middle,—(some used the thumb and the index finger)—were thrust into the mouth, far back into the pharyngeal opening, the end of the thread caught and pulled out. When the whole hard portion came out of the nostrils and the pharynx, then the loose end of the distal tassel of the 'Neti', remaining outside the nose, was caught with the other hand and the same was pulled backwards and forwards, and finally after ten to fifteen frictions, the hard end was pulled out through the mouth completely and the Neti taken out of the nasal passage. It was then washed with clean water, and the process repeated through the other nostril in the same way.

This was a crude process of 'toughening' the mucous membrane of the nose, so that it could withstand the friction of abrasive particles of dust, etc. It was before the advent of rubber. Today, one can use the ordinary urethral rubber catheters that are available in various sizes. Generally Nos. 5 and 6 size (English) are adequate (No. 7, fig. 9). These can be sterilized and also washed cleaner. The use of this neti, as said above, helps to toughen the nasal mucosa and render them less sensitive to irritations of dust particles, etc.

(iii) *Vāta Krama Kapālabhāti* (or *Kapālabhāti* as it is generally known)* :

This process is nothing but a fast and repetitious blowing of the nose without subjecting it to any back pressure, as one generally does, pinching the nose slightly, while blowing it. The ordinary method of blowing the nose is considered to be responsible for many of the complications of chronic rhinitis, e.g., sinusitis, deviations of the septum etc., which, in their own turn, add to the vicious circle. The pinching of the nose, along with the inflamed and congested mucosa, prevents the secretions from being blown out, and the secretions, thus subjected to pressures from both the sides, naturally are thrust into the various sinuses, and the infection is spread into these places which are difficult to approach and clean. So also, the high pressure, exerted in the one congested nostril during such blowing, exerts itself upon the middle septum, pushing it to the other side, and, if such a process is repeated frequently, it naturally would expedite a deviation of the septum.

In *Kapālabhāti*, the nostrils are kept wide open. (It should be noted that they have been cleaned and cleared of their congested material with *Netis* just before.) One blows out forcibly by contracting the lower and middle portions of the abdomen. The anus is also contracted and lifted upwards in the process, automatically, but it is better to attend to it, and volitionally help the process of contraction and elevation of the pelvic diaphragm. This, in its turn, adds to the force of expiration and blowing out. The abdominal wall is then relaxed at once, and whatever air enters the lungs automatically is allowed to get in; immediately, a second stroke is resorted to as before; the cycles are repeated a number of times, varying from ten to twenty, generally at a frequency of about two strokes per second. The chest has to be kept as immobile as possible in the whole process so that the pressure that is exerted upwards is not contained by the expanded chest. The natural tendency otherwise is to lift and expand the chest with every stroke of abdominal muscles. This lifts the sides of the diaphragm and tends to flatten it, instead of pushing it upwards; also the expanded chest spreads the pressure to all sides, thus dissipating its effects. Instead, if one were not to allow the chest to expand when the abdomen is contracted, only the central portion of diaphragm will be pressed up, giving an axial direction to the blowing force and this would add to the strength of the current of air passing through the nostrils.

The idea in this *Kapālabhāti* seems to be, as would be easily surmised, to subject the nostrils to a very forceful current of air, which would exert a suction on all the crevices of the nares as well as the opening of the sinuses, evaporate their contents and help drain them off. Thus, *Kapālabhāti*, as its name implies, is supposed to brighten, i.e., clear up the cephalus, '*Kapāla*' or the skull. In common usage, the term '*kapāla*' is used to denote the forehead. Thus, the term

*Gheraṇḍa Sāhita gives this name to the alternate breathing described under *Prāṇāyāma*. Only in this there is no retention of breath. The above is the form of *Kapālabhāti* traditionally accepted all over India.

OTHER YOGIC THERAPEUTICAL PROCEDURES AND YOGIC PRINCIPLES OF DIET

Kapālabhāti would indicate an exercise that brightens—clears up—the forehead, meaning thereby those parts of it, like the sinuses, nasal cavities, etc., which are liable to congestion and infection. The foregoing description would explain how it achieves this end.

It is advisable to perform two or three longdrawn 'Uḍḍiyāna's in between the 'Jala-Neti' and 'Kapālabhāti'. The negative pressure produced in this Uḍḍiyāna-bandha exerts a suction on the crevices of the nostrils and brings out all the droplets of water that might have remained clogging therein. This done, Kapālabhāti will have only very little water and secretions to drain from the nostrils, and its effect on the sinuses may thereby be enhanced.

(b) PHARYNX

Pharynx is called the '*saptapatha*' in Ayurveda, *i.e.*, 'a square, into which open seven streets' ('*sapta*'-seven, '*patha*'-path), *i.e.*, two nasal openings, two eustachian tubes leading to the middle ears, esophagus, trachea and the mouth. The gate that opens out into the mouth is guarded by tonsils. These stand like two sentinels in between two pillars on each side. The tonsillar bed is formed of a compact fold of several muscles going criss-cross. These pharyngeal muscles are used in opening the mouth and for chewing. Arterioles and venules, that supply and drain the tonsils respectively, pass through the folds of this compact bed of muscles. Unfortunately, with the civilised habits of eating cooked and soft food, man is rarely required to bite hard or masticate. So, these muscles are rarely used to their full capacity by man. When the tonsils get infected, especially if the infection remains a little long, the inflammation that spreads to this tonsillar bed gives rise to a peculiar situation. The inflamed muscle compresses the arterioles and venules and this denies the tonsils of a good blood supply, especially when they are in dire need of it. The process is further complicated when, due to chronic infection, fibrous adhesions develop in these folds. This brings in constriction of the arterioles and venules whereby the tonsils are further starved of this blood supply. Such a situation naturally brings down the resistance of the tissues further and makes them more prone to sepsis.

This is really a bad situation because the tonsils, as they are recognised are really the sentinels that guard the gateway of the second big opening to the respiratory as well as the digestive tracts. This chronic infection further spreads to the adnexa (the neighbouring tissues) giving rise to chronic pharyngitis which in its turn affects the openings of the eustachian tubes. This leads to what is known as catarrhal deafness and head noises. Fibrous adhesions block the eustachian tubes which then do not allow any air to pass through them. Such a passage of air is essential to maintain an equal pressure on both the sides of the ear-drums, *i.e.*, in the middle ear and the external one. Normally, such a passage of air is

established every time one swallows and an equal amount of pressure is maintained on both the sides of the drum, thus keeping it sensitive to sound vibrations. It is this disturbance in the pressure mechanism on the two sides of the ear-drum that gives rise to catarrhal deafness. A further complication occurs, if the infection is carried through the eustachian tubes to the middle ears. Pus is formed there and when it does not find an outlet, the pressure of the fluid breaks open the drum and there is a chronic discharge through the ears (otorrhea).

This, in short, is the story of chronic tonsillitis, pharyngitis and their complications. From this description it should be easy to surmise that the best prophylaxis would be to ensure a good blood supply to the tonsils by exercising the pharyngeal muscles. Yoga does this by resorting to two fine exercises called *Jihvā Bandha* and *Simha Mudrā*.

(i) *Jihvā Bandha or Tongue-lock*

The tongue is lifted and made to press upon the palate. The whole of the surface, *i.e.*, from the root of the tongue to the tip, should be made to press upon the soft and hard portions of the palate. Special attention should be paid to compression between the soft palate and the root of the tongue. One may initially get a coughing reflex or two, but eventually this will subside. The tongue is drawn back a little so that its edges touch the alveolar margin. The mouth is then opened as wide as possible in this exercise. This gives a big pull to the frenum of the tongue. But that is not the more important part of this exercise. The essential part is to feel the pull in the floor of the pharyngeal opening and even in the upper portion of the neck. It must be noted that *Jihvā Bandha* is many a time treated as a substitute for *Jālandhara Bandha* and it is this mechanism of it that is significant from that angle. In fact, one can perform a very tight *Jihvā Bandha* without opening the mouth. In *Prāṇāyāma*, whenever a *Jihvā Bandha* is resorted to, the mouth is never open. It is this compression between the root of the tongue and the soft palate that makes the lock perfect. It is thus a lock formed by a firm apposition of three structures, namely, the back of the pharyngeal wall, the soft palate and the root of the tongue. This, as can be visualised, brings almost all the pharyngeal muscles into action.

(ii) *Simha Mudrā or Lion's Symbol*

Open the mouth wide and pull the tongue out, as far as possible, attempting to make its tip touch the lowermost part of the chin—the lower margin of the mandible. Eyes are moved to look at a point in between the eyebrows at the same time.

Generally, *Simha Mudrā* is resorted to in *Simhāsana*. The legs are crossed at the ankles and the two heels brought under the perineum, squatting on the knees. This is known as the 'Tailor's Squat' ! Hands are placed on the knees with out-stretched fingers and the whole body is made tense. *Simha Mudrā* is mostly resorted to with *Jālandhara Bandha*, *i.e.*, chin lock.

OTHER YOGIC THERAPEUTICAL PROCEDURES AND YOGIC PRINCIPLES OF DIET

Siṃha Mudrā is a part and parcel of Siṃhāsana, but it may be practised separately as a pharyngeal exercise as described above.

A performer of Siṃha Mudrā will experience for himself what a good exercise it gives to the pharyngeal muscles. Thus, Jihvā Bandha and Siṃha Mudrā form a good pair not only for exercising the muscles of the pharyngeal wall but also help to break any fibrous adhesion that might have developed in them.

Generally, in chronic tonsillitis, it is also advisable to prescribe saline gargles. These are better done after massaging the tonsils with a paste made up of the following articles : (i) Myrobalan powder (better, 'Triphalā Cūrṇa'), (ii) Turmeric Powder, and (iii) Rock Salt ('Saindhava'). Equal parts of each article are mixed and made into paste with honey.

The tonsils are massaged from below upwards with this paste and the secretions allowed to dribble out through the open mouth.

(Turmeric is a good cauterising agent. Rock salt provides a higher osmotic pressure to exert a suction on the tonsils. Myrobalan powder is an astringent and honey is a disinfectant healer. Thus, the paste makes a very good combination for application and massage to the tonsils.)

Gargling the throat with warm water thereafter helps to wash the parts completely and also serves as a heat application. It is better to follow this up with Jihvā Bandha and Siṃha Mudrā.

Jihvā Bandha and Siṃha Mudrā are practised alternately, as one exercise, each one being done for two to three seconds. Three rounds of the two together form the initial stage; three to six rounds, adding one round per week, constitute the normal range. The pair is advantageously performed along with the following exercise, which helps to tone up the neck muscles.

(iii) *Brahma Mudrā*

Brahma Mudrā is so called because it symbolises the four heads of Brahmā, one of the gods of the Hindu Trinity. The head, in this exercise, is turned to the left, right, backwards and forwards.

Turn the head slowly backwards till you cannot stretch it any further. Direct the eye-gaze to the tip of the nose and bite hard with your teeth and keep the head relaxed in that position for two to three seconds. Then slowly bring the head down and press the chin against the chest wall. Direct the eye-gaze to a point in between the eyebrows (the 'nasion'), bite hard again and hold the neck in the same position in a relaxed state for two to three seconds. Bring the head back to the normal position and turn it slowly to the right as far as possible trying to

bring it over the shoulder straight. Do not bend the head in this process. Try to look backwards to the right as far as possible, holding this position for two to three seconds. Bring the head slowly back to the front and repeat the same way to the left hand side, *i.e.*, the chin to be directed towards the left shoulder and the gaze to the left as far as possible. Hold this position too for two to three seconds and bring the head back to the normal position. This forms one complete round of Brahma Mudrā. Three rounds are enough to begin with,—three to six rounds, adding one round per week, being taken as a normal dose.

Brahma Mudrā not only tones up the neck muscles but also decongests the parts, bringing about a good circulation in the regions above.

Thus Netis, Kapālabhāti and the exercises mentioned above form a good local treatment for chronic diseases of ear, nose and throat.

II. Gastric Hygiene

There are a number of methods resorted to in Yoga for lavage and reconditioning of the stomach.

Following are the main procedures:

- (1) Dandā-Dhauti—Washing the stomach with a tube ('*dandā*').
- (2) Vastra Dhauti—Cleansing the stomach and giving a massage to its walls with a long ribbon-like strip of fine cloth.
- (3) Vamana Dhauti—Intentional vomiting by starting a vomiting reflex.
- (4) Gajakaraṇi or

Kunjara Kriyā—Controlled expulsion of gastric contents.

These are used for gastric as well as respiratory disorders like Chronic Bronchitis, Asthma, etc. Such a gastric lavage reflexly stimulates a liquefaction of respiratory secretions and helps their expectoration. It is also found that, in most of such respiratory diseases, there is also a general tendency towards heightened mucous secretions all over in the body; the gastric secretions, in most of such cases, happen to come out as thick gluey fluid. As against the common practice of orthodox medicine to prescribe frequent gastric lavages for hyper-acidity, Yoga suggests them in hypo-acidity, for, in every hypo-acidity, there is also a tendency in the stomach to secrete extra mucus. When this is removed and the gastric walls stimulated with Vastra Dhauti, the stomach is found to behave better. For hyper-acidity, Yoga would not advocate frequent lavages, except as a relief measure. It would, on the other hand, advise sedatory methods and ingestion of amphoteric substances like milk, along with some ghee, to inhibit the acid secretion.

(1) DANDA-DHAUTI

This is performed with a rubber tube, about a yard long, its circumference being nearly equal to one's little finger. The tube is sterilised first and kept ready for use in a clean, closed container.

OTHER YOGIC THERAPEUTICAL PROCEDURES AND YOGIC PRINCIPLES OF DIET

Formerly, they used to use an adventitious root of Banyan tree, a yard or so long, or a rib of banana leaf of the same size (Nos. 1 & 2 in fig. 9). If the root was used, it was scraped smooth and kept in water overnight to make it soft and pliable. The rib of Banana leaf, if used, was passed over a fire which made it pliant enough. These could be thrown away after use, and fresh ones procured each time. If none of these was available, a soft rope was made, a yard long and about the thickness of one's finger. This had to be cleaned and boiled every time before use. These days, it is better to use a rubber tube as it can be sterilised well and can last for long (No. 3 in fig. 9). Whenever one uses such rubber articles, one is cautioned to stretch them and see that they are not cracked. Otherwise, accidents are likely to occur as they get broken in between.

One first drinks as much warm saline water as possible (say, 4-5 pints) and then, after washing one's hands quite clean, one takes the rubber tube and coaxes it down the gullet making swallowing movements every now and then and also pushing it down the throat slowly. There might be a bit of retching for a few days at first, but these will be less and less as days pass by, and after a time, the throat will have been so accustomed to it that it will receive the tube without any 'complaint'. One should not be deterred by the initial retching. The best way to avoid retching or to lessen the tendency is to start breathing out through the wide open mouth. Water will start flowing even from the first, coming out in gushes, if there areretchings. But it should not matter much as our idea is to have the water out any way. After a time, however, when theretchings have ceased, water will start to flow out only after the tube has reached the stomach and, thereafter, the flow is maintained because of siphon action. If the flow stops abruptly, either due to kinking of the tube or stopping of siphon action, one has to move the tube up and down in the gullet to let it start again. One learns to do this with ease within a very few days and thereafter it becomes just a child's play, though initially it looks very difficult and horrid !

Warm water itself has, due to its heat, a reflex liquefying influence over all secretions. When one passes the tube ('*danda*') through the esophagus (gullet), it also stimulates the walls of the trachea (windpipe). The esophageal action is reflected on the trachea and helps to bring out the sputum from the chest. Thus, this procedure is not only helpful as a gastric lavage but also as a good expectorant. The vomiting reflex relaxes the bronchial walls and opens them to let the secretions come out. In Asthma, especially, these bronchial walls go into a spasm and mucous pellets block the outward passage of air and, thus, a one-way valve is formed. Resorting to *Danda Dhauti* when one feels the initial difficulty of breathing can ward off an impending attack. This is a common experience of Asthma patients who undergo Yogic treatment. (If the mucous contents of the stomach are very thick and gluey, it is better to use soda bicarb solution than mere saline water. Soda bicarb would help not only to dissolve the mucus, but also,

the carbonic acid gas that is freed from it would help stimulate the walls to higher activity.)

(2) VASTRA DHAUTI

This is performed with a long and smooth strip of muslin cloth—about 22 ft. long and 2½ inches wide. The strip is sterilised and kept in a clean sterilised closed container.

Vastra Dhauti is generally done after Danda Dhauti, but it is not a rule. One cleans one's hands properly, gargles and washes one's mouth (if one has not done Danda Dhauti previously) and then, opening the container, takes hold of one end of the strip of cloth. Holding the end between the index and the middle fingers, one passes the fingers deep into the open mouth in the throat and deposits the end there, making a swallowing action at the same time. As in the case of Danda Dhauti, here too there might be a few retchings. These can be avoided by dipping the end of the cloth in sweetened milk. That makes it more palatable and acceptable to the throat which swallows the piece easily. If there is any tendency towards retching, one should stop and remain quiet for a while, and start swallowing, the moment 'all is quiet' again. The trick lies in persistently and persuasively coaxing the throat and one will be surprised to see how quickly it will turn docile and learn to swallow the whole of the twenty-two feet length, smoothly and quietly, within a matter of few days! *The time allowed for the whole process should not be more than 15 to 20 minutes in toto as thereafter it is quite likely that the pyloric end of the stomach may open and a part of the dhauti may pass into duodenum.* It may then be difficult to take it out as it will be caught at the other end of the stomach. Force might tear the dhauti or harm the tissues making them bleed. It is best to take the dhauti out after about the eighteenth minute, whatever be the length of the dhauti one has succeeded in swallowing. Taking it out is very easy. One just exerts a light pull on the strip and it at once starts coming out smoothly as, by this time, it gets well-lubricated by the mucus of the stomach.

When the Vastra Dhauti reaches the stomach, it forms into a ball due to rhythmic movements of the stomach wall, which compresses and squeezes it periodically. The very insertion of the dhauti acts as a stimulant to the stomach walls. The action of the stomach walls on the ball of the dhauti further stimulates them, as, every time the ball comes into contact with them, the capillary action of its warp and woof has a suction effect on the walls, and the extra mucus coating on them, if any, is thus wiped off. The alternate compression and relaxation of the folds of the dhauti ball too have a similar effect. The net result is that the stomach walls are rendered very clean and devoid of all extra mucous coating, and also stimulated to good peristaltic movements. While Danda Dhauti can only take care of the mucus that lies free in the stomach contents, Vastra Dhauti affords a massage to the stomach walls, wipes them off and takes away their

OTHER YOGIC THERAPEUTICAL PROCEDURES AND YOGIC PRINCIPLES OF DIET

extra mucous coating which comes in the way of their natural secretion of gastric juices, and stimulates them to normal peristaltic action.

Both Danda Dhauti and Vastra Dhauti are of great value as remedies in dyspeptic conditions. It is a common knowledge that many of the respiratory diseases, and even some heart diseases too, are complicated due to the dyspeptical condition of the stomach.

As said initially, however, it is not the custom in Yogic Therapy to prescribe these two dhauties for hyper-acidity, except for mere relief purposes. Its contention is that every such wash stimulates the stomach glands to greater secretion and would only aggravate the condition in the longer run. Use of soda bicarb lotions further complicates the situation because though it neutralises the acid secretions to some extent, some carbonic acid gas is liberated every time and this irritates the stomach mucosa and aggravates the acid secreting tendency. Hence, Yogic therapists do not approve of gastric lavages as a treatment procedure in hyper-chlorhydria and peptic ulcer conditions. Instead, they advocate high protein diet to utilise the acids,—with a proper amount of fats to inhibit their secretion. Milk with ghee in it is considered the best for this purpose. Other measures in this treatment are all on sedative lines.

(3) VAMANA DHAUTI

In case one has not got the Danda Dhauti or Vastra Dhauti and yet would prefer to have a stomach wash, this is the procedure adopted for intentional vomiting. One drinks as much of warm saline water as one can and then goes to the basin or washing place. Leaning a bit forward, one inserts the middle three fingers into the mouth and tickles the soft palate and the pharyngeal wall. This starts a vomiting reflex and water rushes out in gushes. The tickling is repeated when the reflex stops and the process started again. This is carried on till one feels the last drop is out. This is a common way to resort to, whenever one feels queasy in stomach, or has a burning sensation therein. It is a good way to obtain relief on such occasions.

In all these three procedures, one is left with a feeling of rawness in the throat for the first few days. It vanishes after a time. If done early in the mornings there is much less of acid secretion then and the process becomes easy. As the day advances, the acid secretion increases and this leads to a greater burning sensation and feeling of rawness in the throat, so, these are best resorted to early in the morning. They are found very helpful, especially in chronic gastritis.

GAJAKARANI or KUÑJARA-KRIYĀ (LITERALLY : ELEPHANTINE ACTION)

This is called so because, of all the animals, the elephant is by far the only one which can retain water inside and throw it out at will. Of course, it does not

YOGIC THERAPY

take the water into the stomach but only retains it in its trunk, but, all the same, to all apparent purposes, this performance simulates that of the elephant in that the person retains the water inside and throws it out at will.

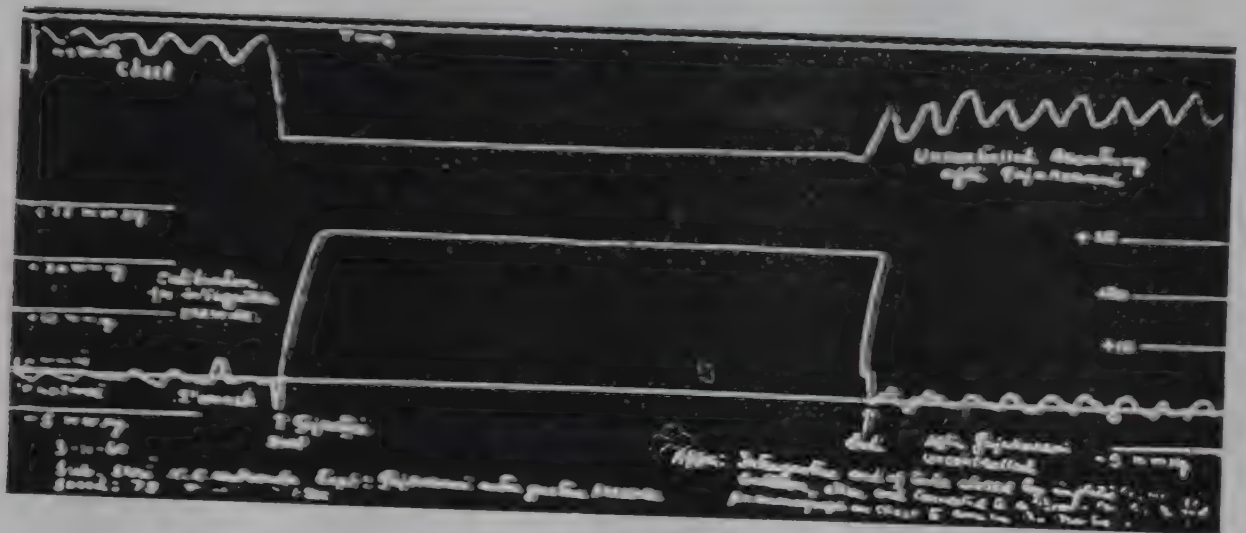
The procedure is as follows :

One practises Vamana Dhauti for a few days or months (as the case may be; this depends upon the individual abilities), and tries to get more and more control over the sphincters of the throat. He tries to vomit with mere intentional retching action, without tickling the soft palate. Once he gets a fair mastery over it, the rest is simple.

Water is taken in large quantities inside and one stands in the washing place and, opening the mouth, one takes what is called an Ujjāyī breath inside, *i.e.*, inspires with a semi-closed glottis, as if one is trying to pronounce 'ah'. The resistance offered by the throat to the passage of air makes for a greater descent of the diaphragm in order to proportionately increase the power of suction to enable one to inspire against the resistance offered by the glottis. The descending diaphragm compresses the stomach; if, at the same time, one were to contract the upper abdominal wall steadily, the stomach will be pressed upon from all sides, and so, its contents will try to pass through the open end, *i.e.*, through the cardiac sphincter of the oesophagus and the water will rush with a force to the throat. If one has learnt to open the sphincter at the glottis at such times, the water is thrown out like a fountain. A steady continued compression of the upper stomach wall, with controlled slow expiratory attempt, makes the water flow out in a steady forceful stream.

Apart from its exhibitory effects, this Gajakaraṇi has high therapeutical values. The high pressure that is created in the upper abdominal cavity exerts a stimulating effect on the viscera of the place, namely, liver, spleen, pancreas, etc. Thus, it is a very good exercise for torpid liver and a sluggish pancreas. The exercise can be done without drinking water for these effects. As against this Gajakaraṇi, the former, *i.e.*, Vamana Dhauti, is sometimes known as Vyāghra-karaṇi or 'Tiger-action'. In Northern Indian languages, they are called 'Kuñjali' and 'Bāghi'. The names are very appropriate when one considers the way water is thrown out in the two. In Gajakaraṇi or Kuñjali, the pressure exerted on the stomach is steady and sustained (fig. 10) and there is a greater control on the glottis, which is kept open to allow a steady flow of the water out, whereas, in Vyāghra-karaṇi or Bāghi (Vamana Dhauti) there is an intermittent *retching* action, and the pressure exerted on the stomach is not continuous; the glottis too opens only while yielding to the pressure of water that is thrown out in gushes. Tigers (for the matter of that, cats, and at times, dogs too) are found to throw out stomach contents by suchretchings. The two could, therefore, be called Elephantine and Feline actions, respectively.

Fig. 10



GAJAKARAṆI

A kymographic record to illustrate the steady positive pressure maintained in Gajakaraṇi for about 42 seconds. The positive pressure here has been purposely maintained rather low by the subject to accommodate kymographic recording. In Vyāghrakaraṇi, the graph will show sudden repeated bouts of positive pressure, a second or two each, as it is accompanied by retching action.

III. Intestinal Hygiene

The processes connected with stimulation of secretive and eliminative functions of intestines, and their flushing or lavage, consist of the following three major 'kriyā's—

- (i) Vātasāra,—lavage and stimulation of intestines with air,
- (ii) Vārisāra or Śankha-Prakṣāḷana,—lavage and stimulation of intestines with water, and
- (iii) Agnisāra,—stimulation of enzymatic secretions ('agni', digestive fire) through certain internal pressure manipulations.

(i) VĀTASĀRA

In this, one tries to swallow as much air as possible, gulping it in mouthfuls. Generally, 20 to 30 mouthfuls are considered sufficient. If left to itself, the air will pass down the intestines, it might get evacuated the other way, while some of it will be absorbed by the tissues. But if one wants to have an air-lavage, one has to resort to what is called 'Nauli-Kriyā' in Yoga, that is isolation and manipulation of abdominal recti and oblique muscles. This procedure creates a negative pressure in the abdomen and alimentary canal which is shifted this way and that on account of the manipulation of abdominal musculature. This is found to stimulate and whip up peristaltic action. This helps to let the air pass expeditiously without getting much absorbed. Such an aeration of the whole alimentary tract is considered very helpful for alimentary hygiene. It is known to modern medicine too. In the case of abdominal tuberculosis, many a time what the surgeon does is merely to open up the abdomen, aerate it for some time and close it again. This is found to have a very beneficial effect.

(ii) VĀRISĀRA (OR ŚANKHA-PRAKṢĀḶANA)

This is a lavage of the whole of the alimentary tract with water. It is also called 'Śankha-prakṣāḷana' (cleansing of the conch). Conch is used by orthodox Indians in their daily 'pujā' for 'abhiṣeka' or bathing the images. Since the passage through which the water flows is a tortuous one and the outlet very narrow, many a time it gets clogged and one has to clean it thoroughly. The alimentary passages too are very tortuous and the anal exit is also very narrow and many a time the intestines get clogged and have to be washed and cleaned to remove the clogging. So, the ancients gave this process an appropriate name, calling it 'cleansing of the conch-like alimentary tract'.

Generally, one drinks for this purpose 3-4 pints of tepid water to which about half an ounce of salt is added and also preferably about one or two ounces of lemon juice. This helps to increase the osmotic pressure of the water and facilitates its speedy passage through the intestines without their absorbing it. Normally, it takes half an hour to two hours for the water to come out from the other end. But a Yoga student expedites the process by resorting to some specific practices that

YOGIC THERAPY

help to ease up the passage of water more speedily. Generally, Viparita karaṇi (4-5 minutes), Mayūrāsana (3-4 times) kept as long as possible, and then Pāda-Hastāsana (3-4 times) are resorted to. This, followed by Nauli kriyā mentioned above, helps to flush the intestines within five or ten minutes and one gets an urge to evacuate. If one cannot perform Mayūrāsana one can substitute Śalabhāsana as the second best. Weaker people can use the inclined plane as a substitute for Viparita karaṇi and do Pavana-Muktāsana and Janu Vakṣāsana thereafter.*

Lemon juice has not only a laxative action on the intestines but is also an appetising agent. As one proceeds with the practice, one can dispense with salt and lemon juice, and perform the *kriyā* with pure tepid water only. For this, it is better to swallow some air along with the drinking of water. Air swallowed thus gets mixed with the water, helps to emulsify the same and prevents its absorption as well as aids its speedy evacuation. After such evacuations, one resorts to Vamana Dhauti to stop the downward hyper-peristalsis and to take away any salt water that might remain in the stomach. A complete traditional flushing requires some hours, and it is best done under guidance and supervision.

(iii) AGNISĀRA

As indicated earlier, the name Agnisāra, given to this practice, signifies that it is intended to 'rake up the (gastric) fire' and make it burn brightly, *i.e.*, it is intended to stimulate the secretion of digestive enzymes ('*pācakapitta*', which was also known as '*jaṭharāgni*' or 'gastric fire') and make them digest the ingested material well.

The procedure is somewhat as follows :

One stands bending the trunk slightly forward and resting one's hands on knees. A complete exhalation is gone through, and keeping this exhalatory position for a while, one pushes the abdomen inward and outward alternately, especially the lower and middle portion of it, *i.e.*, parts below and above the navel. If one tries to take the navel to the spine and then protrude it with a jerk, one gets this motion correctly. These movements are repeated according to capacity in the same exhalatory phase. When one can no longer retain the breath out, one resorts to normal breathing, and, after some rest, repeats the process. Traditional books recommend a hundred (meaning perhaps, thereby, quite a large number) of these repetitions, *i.e.*, of motions in and out, to complete one Agnisārakriyā.

Agnisāra is a very good exercise to help in the case of dyspepsia with a tendency towards hypo-acidity. If there is a tendency towards hyper-acidity, then,

*Some traditions advocate the performance of Bhujāngāsana, Trikoṇāsana with hand raised above, and a twist of the trunk as in Ardhamatsyendrāsana to help expedite the flushing process. Twisting of the trunk is recommended even when one squats for evacuation. This is intended to have a more complete evacuation.

as also if there is an ulceration of stomach or intestines, this practice is contraindicated. It does also help to remove constipation, as it stimulates general peristalsis as well.

IV. Colon Hygiene

Yogic colon hygiene methods comprise the following :

- (i) Vāta-basti,—colonic lavage with air
- (ii) Vāri-basti,—colonic lavage with water
- (iii) Ganeśa-kriyā,—massage of ano-rectal area with finger.

(i) VĀTA-BASTI

For this, as well as Vāri-Basti, a wooden rectal tube is used in Yogic tradition (see No. 8, fig. 9). But, in modern age, a thick flatus tube that is available in the market would serve the purpose equally or better. Experts, who have practised Aśvinī Mudrā (opening and closing the anus, along with lifting of the pelvic diaphragm) for long, can perform this kriya without the help of such accessories. They can open their anal sphincter even as they squat and rest on their haunches and perform Madhyamā Nauli.

For any of the Basti Kriyās, mastery over Nauli is very essential. One sits on the haunches with the knees folded upwards and touching the chest, folding the legs firmly with arms crossed round them. Pressing the knees against the chest and performing Madhyamā Nauli, one opens the anal sphincters and lets the air into the colon. The sphincters close automatically the moment the Nauli is relaxed. The process is repeated again and again till one feels a sense of fullness in the colon.

For those that have no such control over the anal sphincters, a flatus tube comes in handy. A small portion of the tube, say 6-10 inches, is inserted in the rectum and one performs Madhyamā Nauli. Air continues to rush in so long as one maintains the Nauli. It is better to keep the other end of the tube in one's hand. It can be bent and folded on itself, even as one releases the Nauli so that the air that has gone inside is not let out. The same process is repeated five to ten times, the tube drawn out and the air that has gone inside retained. Vāta-Basti is good for mucous colitis.

(ii) VĀRI-BASTI

The process is the same as above. Experts who have control over anal sphincters squat in a basin of water and suck in the water, the same way as described above, into the colon. Others use the basti tube; every time they release the Nauli, they block the free end of the tube with their finger to stop the water from flowing out, and repeat the process five to ten times till they have taken a fair amount of water inside. Those who use a flatus tube can use a mug and hold

YOGIC THERAPY

it between the knees with the other end of the tube inserted into the water. This will have an advantage in that when siphon action starts, water will flow faster due to gravitational action too.

One can press the tube upon the rim of the mug and prevent the back flow of water when one releases one's Nauli. Enough of water can go in, in five to ten repetitions of Nauli.

Once the water is taken inside like this, one resorts to manipulation of the abdominal muscles,—Nauli kriyā—, repeating it from left to right a number of times, 20 to 40, and then again the same way right to left. This is done fast and requires only a minute or two. This helps to move the water inside the colon from the sigmoid to caecum and *vice versa* and cleanse the whole of the large intestine.

After evacuation, tradition requires one to perform Mayūrāsana with legs folded at the knees and spread out fanwise. This helps to evacuate the colon completely as the pressure exerted thus stimulates further peristalsis and any water that might have remained inside is thrown out when one visits the lavatory a second time.

This Yogic flushing of the colon has a decided advantage over the modern enemata. In enemas, water is made to flow inside under higher pressure, taking advantage of either gravity or a compressible bulb. This dilates the walls of the rectum and colon and helps mostly to clean the distal parts. It's only when the water is kept for some time that it tends to go a little deeper. For a full flushing action,—a high enema—, one has to let the water slowly in, lying on one's right side to let the water flow towards the caecum gravitationally. The water is retained as long as one can bear and then evacuated. Even this does not help to clean the colon well. Moreover, if these enemata are taken, off and on, the colon loses its tone and becomes still more sluggish. Basti, on the other hand, adds to the tone of the colon, since water is sucked in, and manipulated inside, only through the actions of the colon itself.

(iii) GANESA KRIYĀ OR MŪLA ŚODHANA

This consists of cleansing and massage of the ano-rectal area by means of one's finger. It is best to use a finger stall for this. Tradition prefers the root of turmeric plant.

A finger stall is worn on the middle finger which is then dipped in castor oil. The finger is then inserted into the anal opening as deep as one can go,—at least $3\frac{1}{4}$ of an inch inside and a thorough massage is given to both the anal sphincters by turning the finger round inside both ways, clockwise and anti-clockwise.

This procedure helps to keep the anal sphincters from turning abnormally dry and tones them up. Dryness of anal sphincters is mostly a common com-

OTHER YOGIC THERAPEUTICAL PROCEDURES AND YOGIC PRINCIPLES OF DIET

plaint in old age and this gives rise to clogging of faeces and a pouching round about the sphincters. It is a very good process even otherwise to reflexly stimulate and recondition the pelvic viscera, as the anal sphincters are supplied by the pelvic nerves (the *nervi erigentes*), which supply most of organs located in the pelvis.

The above are some of the major procedures of Yogic personal hygiene used in therapy. These are best resorted to early in the mornings, especially the methods of gastric, intestinal and colonic lavage, before breakfast. It is advised that some solid breakfast is taken within half an hour after these lavages, and the stomach and bowels are not kept empty for long.

Vamana Dhauti is traditionally resorted to between the third and fourth hour after meals and whatever meal has still remained in the *gastrum* is thrown out thus. Here, too, one is advised to take some light solid food within half an hour after the Dhauti.

The emphasis laid on a meticulous cleansing and lavage of the whole alimentary tract seems to some to be rather disproportionate. This has led one Western critic to call it "the Hindu obsession with the bowel functions which permeated religious observances and social customs". This is rather an unfair remark. Again, these lavages are never used in any of the Hindu religious observances or social custom. The only obsession with the bowel function in the Hindu religion, if one can call it as such, is in the periodical fastings and restrictions of diet that it advocates. But this is a common feature of most of the religions, including Judaism and Christianity. It should be noted that the alimentary tract is not intended by Nature to be merely for digestion and assimilation. Together with lungs, skin and kidneys, it forms a main channel of elimination. Every kind of poison and toxin from the blood stream and tissues is constantly thrown into the stomach and intestines and are evacuated the normal way. These substances are not in solid form but are mucoid and malodorous. The elimination of these is facilitated, if one resorts to fasting and alimentary lavages. This expedites the carriage of the waste matter by the blood to the intestines. Nature resorts to this method even normally, and in such cases, an extra quantity of mucous is found in the excreta. Yoga has stressed upon this fact. It advises the performance of these '*kriyās*' (purificatory processes) only for those that have such mucoid tendencies as also for those that have a tendency towards obesity, specifically putting it that others may not resort to them ("*medaślesmādhikah pūrvam śatkarmāṇi samācāret anyastu nācāret tāni doṣāṇāṃ samabhāvataḥ*" H. Y. P. II-21).

Yogic Diet

The diet prescribed for the student of Yoga, especially for one who practises Haṭha Yoga methods, is a very strict one. He is enjoined to eschew not only pungent and sour articles but also to avoid salt (the usual table salt) as far as

possible. Flesh foods and stimulant beverages are also strictly proscribed. A lacto-vegetarian diet, with tolerable amount of cereals but not much of pulses, is generally the one that is mostly recommended.

It should be noted that while the Westerners divide food into vegetarian and non-vegetarian and include in the latter all 'animal products', in India the food is classified into flesh foods and non-flesh foods. The idea behind this classification seems to be that there is less of life in flesh; the life-energy latent in inert substances like earth, water, etc., gets first concentrated in plants, and it passes into the animal body only 'second hand'. The carnivorous animals subsist mostly on the flesh of ('vegetarian') herbivorous animals. Though man seems to have passed through both carnivorous as well as herbivorous stages, he has adopted more of a herbivorous life through experience of ages. People who are accustomed to flesh foods seem to think that they cannot subsist on mere vegetable. Those medical men who are accustomed to such a diet, advise their patients against pure vegetarianism, forgetting that there are plenty of men in the world who subsist on vegetable food and are none the worse for it.

Eggs, though considered as non-flesh food, are not recommended in Yoga because of their high protein contents. On the whole, the diet prescribed for regular Yogic practitioners, seems to be a 'low protein diet'. The reason behind this seems to be that there is a higher adreno-sympathetic tide at least in the beginning stages. The Prāṇāyāmic and other Yogic exercises mostly stimulate the para-sympathetic systems of the body and this seems to give rise to a compensatory over-balance of adreno-sympathetic activity initially. It takes some time for the system to regain its normal equilibrium, which it does after some period of constant practice. All this can be surmised from the empirical observations by the ancients of the outer results of these practices and the instructions given by them to counteract their bad effects. Thus, it is claimed that, in the early stages of Yogic practices, there is a decrease in the amount of urine and stools, a tendency to retain sodium salts and water in the system, a general high sensitivity of the nervous system to react to external stimuli and so on. And, as a precaution against this, one is advised during the early stages of these Yogic practices the following :

- (1) To resort to a low protein diet—as salt free (the salt being sodium salt) as possible and to eschew all irritating or stimulating articles from his diet.
- (2) To avoid all strenuous activities—even long and brisk walks.
- (3) And, since a general salt withdrawal has been prescribed,—to avoid a depletion of salts that are already in the body. With this end in view, one is advised to avoid sitting by the fire-side, sexual intercourse and long walks (it being taken for granted that the student of Yoga will have avoided other strains).

OTHER YOGIC THERAPEUTICAL PROCEDURES AND YOGIC PRINCIPLES OF DIET

- (4) To train oneself to cultivate an impersonal outlook on life so as to avoid irritations in one's inter-personal relationship. As indicated in the chapter on 'Cultivation of Correct Psychological Attitudes', all tendencies towards chafing and resentment are to be avoided, knowing that these do harm to oneself in the longer run.

The whole aim seems to be to help maintain an adequate acid-base balance in the body that is conducive to assist a ready adaptability but neither add to an over-irritability nor to lack of sensitivity.

In prescribing diet, therefore, this principle has to be borne in mind, and especially the circumstances that have led the Yoga adepts to advise a particular diet to the novices in Yoga practice. It may not be necessary to insist in the case of patients, on such a strict regime as is enjoined in the case of those serious students of Yoga who are expected to go through Yoga practices for hours together. The preceding discussion is only intended to indicate the line of thinking in the prescription of diet in Yogic Therapy. The dietetic needs of every individual case, according to its disorders and dysfunctions will of course, have to be taken into consideration in actual practice. Here we are dealing only with the general basic principles.

It may be noted, in passing, that, in Yoga, psycho-physiological considerations weigh more, in the formulation of a basis for prescription of diet, than mere moral or socio-religious ones.

As noted above, we have purposely given here only the principles of Yogic diet. It would be unwise to dogmatise about such subjects. For, a suitable diet depends so much on availability of foodstuffs and their preparations, as also on climate, age, personal habits and idiosyncracies. An Eskimo, for example, could never thrive on a 'vegetarian' diet. It would create for him a nutritional problem! Sir Paul Dukes⁹ gives his interesting experience of how some Eskimos, appearing in a theatrical show in Chicago, found they were rapidly 'wilting from lack of nourishment'. One day they discovered a packet of tallow candles and their nutritional problem was solved! So, one will have to take every individual as a standard unto himself or herself, not only for such a prescription of diet, but for the prescription of therapeutical procedures as well.

CHAPTER V

DHYĀNA AS A GREAT TRANQUILLISER

We have [so far talked about the usual preliminary procedures of Yoga to help bring in a balanced working of body and mind. Dhyāna is the main sheet-anchor in this whole technique. However, Dhyāna could not be resorted to, so long as the body and mind were under strong divergent pulls, and in a highly imbalanced state. So, one could not recommend the practice of Dhyāna earlier. It was only when the mind and body were a bit stabilized that one could resort to the practice. Dhyāna seems to be considered an essential process in Yoga for the attainment of real emotional stability and integration of personality. This process of Dhyāna has to be practised in a very relaxed way to attain the beneficial results claimed for it. The first attempt in this is towards arresting one's customary images.

Strangely enough, Dr. Trigant Burrow (of the Lifwynn Foundation, West Port, Connecticut), working independently on his own hypothesis regarding deviation in behaviour, seems to have come practically to the same conclusion. It will be of interest, therefore, to know something of his findings and methods, as that may help us to understand the significance of these Yogic processes better.

One of the earliest and direct students of Freud and Jung, Dr. Burrow belonged to the first batch of psychiatrists, who introduced psycho-analysis in America. He soon came to realise, however, that the 'underlying determinants of Man's social inter-relations' lay not in this individual or that, but in man as a phylum. Therefore, the species of 'man' was the essential material requiring investigation and adjustment. This phyletic approach to the problem of human behaviour led him and his associates to 'an analysis of the physiological patterns of tension and stress that entered into the structure of neurosis or of human conflict'. He and Clarence Shields propounded a hypothesis, nearly fifty years ago, that the prevailing standards of right and wrong, which arbitrarily differentiated one individual from another and one group from another, were not based on the true organismic pattern of man's behaviour, but that something had gone wrong during the process of phylogenesis. They felt that a system of reactions that was definitely deviate and disorganised could be traced throughout the human species.

What was true of one was also true of everybody else. Man's behaviour today was obstructed and impeded by a false habit of reasoning. His moods and motivations were mere transmutations into terms of consciousness of the undifferentiated preconscious mode of behaviour which was his in early childhood. This primary mode of behaviour was also the same in the early

DHYANA AS A GREAT TRANQUILLISER

preconscious childhood of the race. 'This universal division and conflict within the mental processes of man, this 'I' versus 'you' dichotomy, appears to reflect a socially unconscious factor that is typical of inter-relational behaviour of human society throughout' (p-25 'Neurosis of Man')⁷. The fact was that man, as a phylum, had not matured. Therefore, Dr. Burrow calls his method 'Phylo-Analysis' and 'Phylo-Synthesis'.

The main difference between phylo-analysis and psycho-analysis lies in the fact that whereas the psycho-analyst asks his subject to let his ideas flow freely and spontaneously, even as they happen to come, the subject in phylo-analysis takes recourse to arresting his customary images. Again, the subject in Lyfwynn laboratory of phylo-analysis is the researcher himself, the experimenter being there only to control the apparatus, and measure the objective phenomena,—like changes in respiration, brain-waves, movements of the eye, etc.,—and, at times, to act as a control. Thus, while in psycho-analysis the subject need give only prompt expression to every idea that comes up to him, the subject in phylo-analysis tries to shut off all such ideas but attempts to 'recall himself to himself' (cf. "*manasā mana ālokya*"—"observing the mind with the mind" H.Y.P.-IV-54). The fixated images are excluded again and again along with their effects. The procedure is somewhat as follows : the subject sits straight in a relaxed way, with the eyes closed. This is intended to maintain a steadfast internal sense of balance, and tension connected with the eyes. Looking in front, at a curtain of uniform blackness, as it were, an attempt is to be made to rest the eyes on a point (not visible of course) that is felt kinaesthetically to be directly in line with the normal visual axis. (There are several 'such cerebro-ocular' Mudrās, in Yoga—Unmani, Khecari and Śāmbhavi being found in general usage,—and fixation of eyes on a point is common to them all.) This, as Dr. Burrow states, leads to 'a sustained awareness of an indeterminant physiological process', that can only be appreciated by the organism subjectively.

If such a cerebro-ocular posture is sustained over a period of time, (a few seconds only in the beginning) the subject's customary affect images get automatically eliminated. As Dr. Burrow describes, 'the mental and emotional pain and disappointment resultant from the frustration among us of ditentive social feelings and impulses was suddenly dissipated' (p. 240-*ibid*)⁷. If the practice is continued, the initial feeling of tension in the region of the eyes and inside the head gives place to a sensation of steadier tone or balance of tension within the body musculature as a whole. Thus, Burrow could consistently differentiate between two systems of neuro-muscular tension, (i) the superficial secondary associational system of tension, and (ii) the deeper organismic system of tension. The first one is regarded by Dr. Burrow as socially conditioned, the second being the primary and unconditioned. He calls the first state 'Ditention' and the second one 'Cotentention'. A subject is likely to lapse again and again into ditentive state, his mind darting back into its customary images automatically. To come back to the cotentive state, one has to repeat the whole

YOGIC THERAPY

process again. If the technique is persisted in over a sufficient period of time, it is found that the barriers to the common interests are broken down.

During the experiments, when the subject passed from one state to another, his respiratory curves and those of the controls were recorded by means of an electrically driven Kymograph, the experimenter himself and another forming controls. The average respiratory rate was found to drop from 13.22 movements/min. in ditention to 4.63 movements/min. in cotention and this change was not brought about by any voluntary control but occurred automatically as the states of tension altered.

Jone's Basal Metabolism apparatus used in the experiments showed that while in the state of ditention the average volume of air inspired per minute was 6.95 litres, that in the state of cotention was only 4.08 litres.

If the respiratory rate and the volume of inspired air were compared, it would be found that though the respiratory rate in cotention went down, the average intake of air per respiration in cotention was greater than the one in ditention, $(6.95/13.22 \text{ } 4.05/4.63)$, i.e., the respiratory movements were deeper in cotention than in ditention; though the total air inspired per minute was not equal in the two states, the amount of oxygen absorbed per minute was practically the same, namely 0.22 litre.

The movements of the eye in the course of experimentation were not only observed by direct inspection and measurement of inter-pupillary distance but were recorded both photographically and electrically. It was found that the frequency of both the eye movements as well as lid movements was reduced markedly during cotention.

Electro-encephalographic records showed reduction in the percentage of alpha-time and a decrease in the amplitude of the alpha wave during cotention, indicating a general diminution in cortical potential.

Along with the objective records, the subject's subjective state also was given attention to. Thus, to put it in Dr. Burrow's own words (p-225 'Neurosis of Man')⁷ "With his increasing observation of the sensation caused by the partitive stress of the affecto-symbolic segment or of the separate 'I' persona, there develops concurrently the sense of a larger background that is not affective, partitive, ditentive, that is not the 'I' persona, but that is the primary organism of man in its native spontaneous continuity and solidarity. He begins to sense his own native organism with its uninhibited non-affective interests. And thus is born the sensation of syntoncity of cotention or common tension."

Yoga, too, seems to have resorted to this same phylic approach in the processes of integration of personality. The procedure followed by the ancient Yogins in Āsana (meditational type) is very similar to that of Dr. Burrow

DHYĀNA AS A GREAT TRANQUILLISER

and his associates, and the claims made by them for this are also the same. In this connection, it has to be noted that every meditational posture requires its practitioner to fix his gaze in a particular way and Śāmbhavi Mudrā or resting of eyes on a point far away but directly in line with the normal visual axis is a common practice advocated in Yoga.

The claim made by Patañjali for Āsanās, it will be noted, fits in exactly with the one that is made by Dr. Burrow after years of research, that, the sensation of a separate 'I' persona with its consequent 'I' *versus* 'you' dichotomy or 'dvandva' ceases, and in its stead, the practitioner begins to sense "his own native organism in its spontaneous continuity and solidarity".

We have quoted Dr. Burrow's work—that of an *unbiased Western scientist*—extensively to show the scientific basis of Dhyāna, and how to achieve it in a relaxed way. Many a time, in trying to 'concentrate', one strains a good lot and increases one's tensions instead of decreasing them. People have come to grief mainly because of such wrong practice of Dhyāna. The process of 'ananta-samāpatti', 'Mahāhradānusandhāna', or 'prāṇa-dharaṇā', when taken to their logical end, can lead to such relaxed Dhyāna. In our laboratory, we have found similar results in respiratory rate and depth, and metabolic functions, in Dhyāna. But the process of Dhyāna goes much deeper than the state described by Dr. Burrow, and the eliminations of the dichotomous elements are more thorough as reported by the subjects themselves. When Dhyāna is carried out successfully, it not only shows a reduction in the percentages of alpha-time, and a decrease in the amplitude of alpha-wave as in Dr. Burrow's experiments but the amplitude is lowered so much that it actually gives rise to an apparent 'flattening' of alpha. The alpha rhythm does not confine itself to occipital and parietal areas as usual, but is spread all over, and the 'flattening' tendency too seems to be a general one. (fig. 11). The attention gets so fixed that there is practically an oblivion about other things. Even pin-pricks, or other painful stimuli do not affect the electro-encephalographic records. A person can normally stimulate a high degree of indifference, but the E.E.G. records would show the effects of such stimulation. The absence of these in E.E.G. during the process of deep stages of Dhyāna shows how the psycho-physiological mechanism as a whole remains completely pre-occupied but in a very relaxed way in the process of Dhyāna and is not at all aroused therefrom.

It may not be possible for each and every man to attain such a high state of complete 'insulation' from external as well as internal stimuli. But if one were to resort to Dhyāna as described above for some length of time regularly, one could find it very helpful to overcome the abnormal tensions of the hectic life that is a common feature of the present-day world. In a booklet on Yogic Therapy we could say no more than this.

EPILOGUE

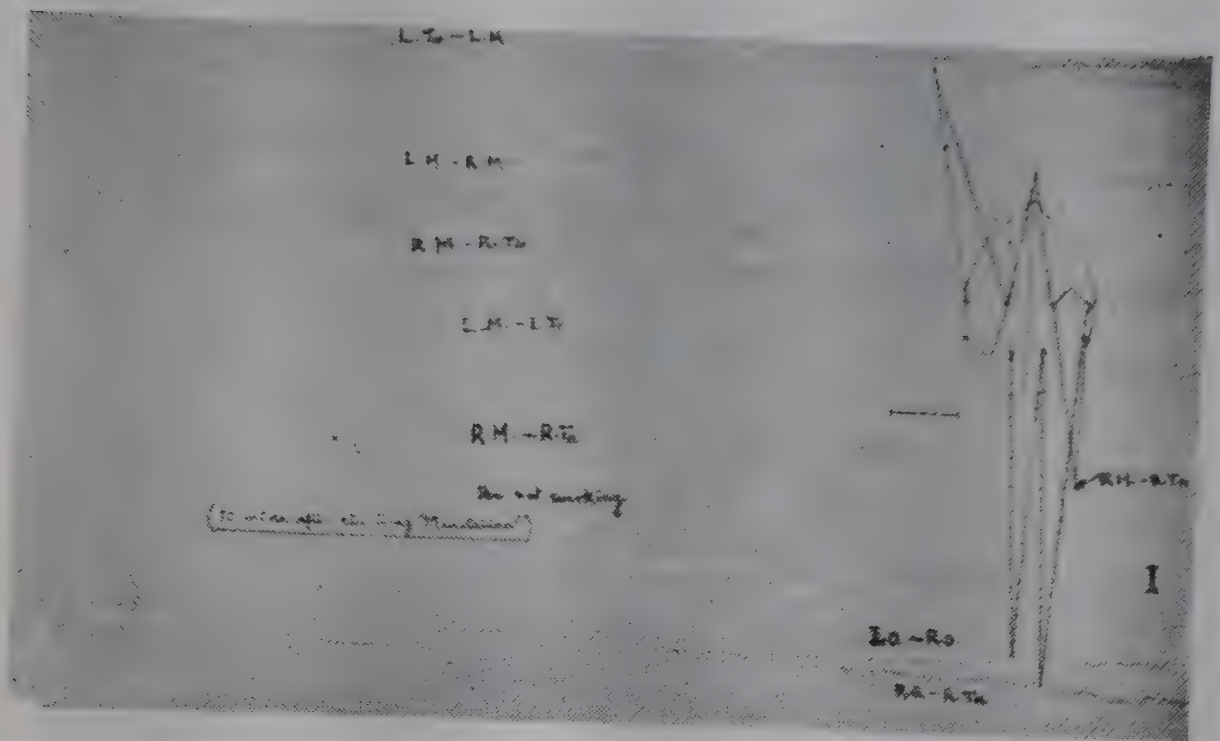
So far, we have given a broad outline of the various procedures followed in Yogic therapy, the principles on which they are based and the scientific background of the same. The therapy can have real practical value, provided its principles are not mixed up with those of some other therapy. Even in some of the modern schools of Yoga, one finds a strong tendency and temptation to mix these up, either perhaps with an innocent view to obtain sanction or to add 'elegance' to demonstrations. Medical men, on the other hand, are prone to look upon the system as some form of special 'exercise' therapy. The Yogic therapeutical procedures do contain some exercises, but it is to be noted that the physiology of ordinary dynamic and violent exercises cannot be applied to them. Yogic therapy, however, does not consist of mere exercise; it is a *composite* treatment procedure which gives attention to all the aspects of human personality.

Looking at these procedures from a general therapeutical angle, it strikes one that these methods are available only in the treatment of some chronic disorders. While the Haṭha Yogic exercises can set right many metabolic dysfunctions and also some physical deformities and disabilities, the real place of Yogic therapy, as a whole, lies in the psycho-somatic field of medicine, where it seems to have a special application. Here too, cases of Vegetative Neurosis, where the cause is known to the patient, can be tackled directly with this therapy with a considerable measure of success. Cases of Conversion Neurosis may require some help of modern methods of psycho-analysis, etc., for a complete cure. If this last is preceded by a requisite course of Haṭha Yogic exercises, as said before, to break off tensions, one could succeed well even with a very superficial and short-term psycho-therapy.

The Yogic therapy, as such, cannot be of much use in acute diseases nor in infective processes, but, as indicated earlier, it can prevent such attacks by improving one's general resistance and power of immunity. It could also provide rehabilitatory treatment after the diseases have been tackled successfully, and help restoration of function, which only can be called a real cure of diseases. In chronic infective processes, it can provide an efficient ancillary treatment. All this, however, will require a good and understanding co-operation between the doctor and the Yogic therapist.

Āsanas and Prāṇāyāmas are common to both, Pātañjala as well as Haṭha Yoga. But in Haṭha Yoga, the processes involved are more variable than those of Pātañjala Yoga. The speciality of Haṭha Yoga, however, lies in its employment of Kriyās, Bandhas and Mudrās. The latter two have more or less a direct approach to the vegetative system.

Fig. 11



E.E.G. DURING DEEP DHYĀNA STATE

Note the spread of 'alpha' all over and the tendency towards a decrease in its amplitude, in some places to nearly an apparent flattening of the waves. Before starting meditation, as the subject was sitting in a relaxed state, the 'alpha' had spread all over but its tendency was opposite of this, *i.e.*, towards an increase in amplitude.

EPILOGUE

We, in our Health Centres, attempt to hit at a fair combination of both and have found that such a procedure expedites results. Pātañjala Yoga demands more or less an individual approach. Haṭha Yoga exercises, on the other hand, can be given on a mass scale and can help in breaking off nervous tensions. Once the tensions are broken, it is easy to bring out the deep-seated repressions and deal with them appropriately with the patients' co-operation. It has been our experience that any attempt to bring them out, before the tensions are eased, is attended with great risks, sometimes even to life. Otherwise, it requires a process of deep psycho-analysis which takes quite a good length of time to succeed in bringing about a sufficient catharsis. It has also been found that with the persistent presence of tensions, the patient is not in a position, nor in a mood, to co-operate. That is why we resort more to Haṭha Yoga practices in therapy.

In prescribing Yogic treatment, however, the requirements of each individual case will have to be borne in mind. This is, of course, true of every other therapy, and it is for this that one must know its basic principles first. While the Yogic therapy in general has few contra-indications, but only the limitations given above, its individual practices and procedures will have to be prescribed with due caution and care, bearing in mind the physiological effects of each. Thus, for Hernia, for example, all exercises that are likely to increase the intra-abdominal pressure have to be avoided. For Spondylolysis, most of the bending and stretching exercises will be contra-indicated; so too, for High Blood Pressure, the exercises and practices to be prescribed will have to be only of sedative character. These are some of the major and common examples, meant to show the direction of treatment. There are many special exercises and forms of treatment in Yoga for various specific disorders. Time and space do not permit us to deal with them. But what has been presented so far should perhaps be sufficient to show that Yoga can find a pride of place as a special branch in modern psycho-physical medicine.

APPENDIX A

A SCHEDULE IN YOGIC PHYSICAL CULTURE RECOMMENDED FOR PERSONS OF AVERAGE HEALTH

Before starting these Courses, please read once again the Sections on Āsanas, Mudrās and Bandhas, and Prāṇāyāma. Learn to sit in a relaxed way and to experience the 'Oceanic Feeling', till it comes up naturally without much effort. This will greatly help to make the practices effective.

I. Easy course

- (1) Bhujāṅgāsana.
- (2) Ardha Śalabhāsana.
- (3) Ardha Halāsana.
- (4) Yoga-Mudrā.
- (5) Paścimatāna.
- (6) Ujjāyī.

II. Short course

- (1) Bhujāṅgāsana.
- (2) Ardha Śalabhāsana.
- (3) Dhanurāsana.
- (4) Halāsana.
- (5) Paścimatāna.
- (6) Ardha Matsyendrāsana.
- (7) Yoga-Mudrā.
- (8) Viparīta Karaṇi.
- (9) Uḍḍiyāna.
- (10) Ujjāyī.

III. Full course

- (1) Bhujāṅgāsana.
- (2) Śalabhāsana.
- (3) Dhanurāsana.
- (4) Halāsana.
- (5) Ardha Matsyendrāsana.
- (6) Paścimatāna.
- (7) Mayūrāsana.
- (8) Yoga-Mudrā.
- (9) Śīrṣāsana.
- (10) Sarvāṅgāsana.
- (11) Matsyāsana.
- (12) Śavāsana.
- (13) Uḍḍiyāna.
- (14) Nauli.
- (15) Ujjāyī.

A few hints regarding the courses

(1) The Easy Course is intended for beginners and very weak persons. It is expected that they have no specific complaints.

APPENDIX A

(2) The Short Course is framed for those people who cannot, for want of time, strength or wish, follow the Full Course.

(3) All the hints given to Yogic Physical Culturists concerning the Full Course hereafter should be applicable to Easy Course as well as Short Course.

(4) Exercises tabulated in the Short Course may be started at the age of 9. Ujjāyī and Uḍḍiyāna should not be begun, however, before 12 or even 13.

(5) The Short Course is available to women as well as to men.

(6) Those that can tolerate Yogic exercises in the morning may, if they so choose, undergo the Short Course both morning and evening. Others should practise Ujjāyī and Uḍḍiyāna in the morning and the rest of the exercises in the evening. Ujjāyī is to be practised in the evening also.

(7) The Short Course may be made shorter not by omitting any of the practices tabled here, but by undergoing all the exercises on a smaller scale.

(8) Although the practice of the Short Course or of the Easy Course tabulated heretofore is comparatively innocent, people suffering from any serious disorder should not undertake these exercises on their own responsibility.

Limitations

(1) Students of Yogic Physical Culture will do well to remember the limitations which have been summarized here in the following section.

(2) People suffering from running ears, weak eye capillaries, and weak heart should avoid the practice of Śīrṣāsana. Viparīta Karaṇi, Sarvāṅgāsana and Śīrṣāsana may be very cautiously practised by those that are troubled by chronic nasal catarrh; Bhujāṅgāsana, Śalabhāsana and Dhanurāsana are to be avoided by persons with considerable tenderness in the abdominal viscera, especially when the spleen is excessively enlarged. Constipated people will do well in not practising Yoga-Mudrā and Paścimatāna on a large measure. Generally speaking, weakness in the heart should exclude the exercises of Uḍḍiyāna, and Nauli. Weakness in the lungs also indicates the exclusion of Ujjāyī Kumbhaka, although the Recaka and Pūraka of Ujjāyī are available even to people with weak lungs. Persons, recording blood pressure above 150 and below 100 mm. Hg. habitually, should also exclude the Yogic exercises altogether, provided they are going to undertake these exercises on their own responsibility.

N.B.—Any one suffering from considerable weakness in any part of the body will do well to consult an expert for giving him the necessary exercise.

Cautions

(3) Under no circumstances should the exercises lead to languor. The student should come out of his practices fully refreshed,—a sort of quiet settling down on the nerves.

(4) The whole course need not be gone through at a stretch. It may be profitably punctuated with convenient periods of rest.

(5) Even then, care should be taken to see that the total amount of energy expended does not strain the system.

(6) '*Be with caution bold*' is our repeated advice to the students of Yogic Physical Culture.

(7) If there is a considerable break in the practice of these exercises, whenever the exercises are to be started again, they should start on a humbler scale, although the full measure may be reached somewhat rapidly.

YOGIC THERAPY

(8) After severe illness, the Yogic exercises should be undertaken only when the patient recovers sufficient energy for their practice. It would always be desirable, by way of a cautious measure, to prefix to the practice of these exercises, a moderately long walk everyday for a week or so.

(9) Yogic exercises should never commence for an hour and a half after taking even a moderate quantity of solid or a good quantity of liquid food. Half a cup of liquid food would allow the exercises to be started in half an hour. At least four hours and a half must elapse between heavy meal and the Yogic exercises. In short, Yogic exercises should always be taken with a light stomach.

(10) There is no harm if food is taken in a moderate quantity in something like half an hour after the Yogic exercises.

Time and sequence

(11) The course is perfectly general. The proportion of time and repetitions may be fixed according to one's capacity, in consultation with one's physician.

(12) People who want to reduce their time of exercise to the lowest possible minimum, should take up the **SHORT COURSE**. Beginners are, however, advised to start with **EASY COURSE** first and gradually develop it into **FULL COURSE**.

(13) Uddiyāna, Nauli and Ujjāyī should be practised in the morning, in the sequence in which they are taken up here.

(14) Uddiyāna and Nauli may be practised by constipated people even before they get the call of Nature.

(15) Taking a few ounces, say ten to twenty, of tepid water, with a little rock-salt added to it (1 grain per ounce), before practising Nauli, may induce rapid bowel movement.

(16) Ujjāyī should follow not only evacuation, but, as far as possible, a full bath. It is best practised in Padmāsana or Siddhāsana.

(17) Āsanās are better gone through in the evening because muscles are then more elastic than in the morning.

(18) Yoga-Mudrā, so also Ujjāyī, may be practised also in the evening.

(19) Yoga-Mudrā should be taken up with Āsanās and be practised before Śavāsana.

(20) Whether in the morning or in the evening, the Yogic exercises should be practised in the following order. First take Āsanās with Yoga-Mudrā, then the Bandha and the Kriyā and lastly the Prāṇāyāmas.

(21) In practising Āsanās, students will do well to preserve the sequence of the various poses that has been followed in enlisting them here. In getting oneself trained, however, one need not follow this sequence rigorously. One may pick up the different Āsanās in any order he likes, the easiest being taken up first and the more difficult being taken up later on.

(22) The omission of a particular practice does not disqualify a student to go through the remaining part of the scheme with advantage.

Combination with other exercises

(23) There is no harm in undergoing the Yogic exercises and strenuous muscular exercises in the same day.

(24) But the two should never be practised immediately before one another. At least a period of twenty minutes should be allowed to go by.

(25) Those that want to finish their exercises with balance introduced into their system should take the Yogic exercises last. But those that want to have a spirit of exhilaration at the end, should finish with the muscular exercises.

APPENDIX A

(26) Walk, when taken as an exercise, must be brisk, and for considerations of sequence should be treated as a muscular exercise. A stroll stands on a different level, and may precede or follow the Yogic exercises.

Place

(27) Any well-ventilated place may be used for Yogic exercises. The only care to be taken is not to allow the body to be exposed to a strong draught.

Seat

(28) For a spiritual culturist the traditional arrangement of seating is excellent. A carpet of Kuśa grass, with a well-tanned deer-hide spread on it, the hide in its turn being covered with a daily washed piece of thick khaddar, makes a very comfortable seat. A physical culturist may use a carpet large enough to accommodate the size of the individual practising Yogic exercises. From the hygienic point of view, it is desirable that this carpet also is covered with a daily washed piece of khaddar.

In the absence of a Kuśa grass carpet, any other grass carpet will do.

Those that may have a conscientious objection to the use of a hide, should make use of a thick woollen cloth folded over several times.

Yogic exercises and bath

(29) A whole bath should precede the Yogic exercises, because it promotes blood circulation uniformly throughout the body, and the diversion of a richer blood current to a particular part by means of a Yogic exercise becomes easier.

(30) But a local bath intended for a particular part of the body for promoting blood circulation therein, should neither precede nor follow the general Yogic exercises immediately, although local baths and particular Yogic exercises may be combined with the advice of an expert.

Food, Drink, Smoke, etc.

(31) Every man should try to find which food suits him the best, irrespective of the dictates of his palate.

(32) Even people, who maintain more than average health, should restrict themselves to such varieties of food as they find agreeable. Every meal should be of a moderate quantity which must be well-masticated, so that it may become freely mixed with the saliva and its digestion may become easier.

(33) People with weak digestion should take a low protein diet. They should satisfy themselves with two meals per day and preferably even with one, the place of the other meal being taken by light refreshment.

(34) Those who suffer from dyspepsia and constipation or have some uric acid trouble will do well to eliminate all sorts of pulse. They should also avoid potatoes, brinjals and onions.

(35) Water taken half an hour after the meal suits almost every constitution. Those that have their digestive capacity unimpaired may take water along with their food.

(36) All alcoholic drinks are to be cautiously avoided. Stimulants such as tea and coffee are never to be taken in excess and may preferably be eliminated altogether. For a man that cares for his health, there cannot be a more luxurious drink than plain water.

(37) Heavy smoking of whatever sort invariably shatters the nerves, if carried on across many years. Weak nerves, persistent cough, sore throat, etc., always harass a heavy smoker and may often beset the path even of a light smoker.

(38) All unnatural and illegitimate sexual acts are sinful. Excesses committed even in natural and legitimate acts do not stand upon a different footing.

(39) No sexual intercourse is healthy unless it is undertaken as a matter of absolute physiological necessity.

Exercises for women and children

(40) The FULL COURSE is available to women *with the exception of Mayurāsana*.

(41) In the case of women, it is desirable to suspend all the Yogic exercises during the period of menses and pregnancy.

(42) Boys and girls will do well first to start with the SHORT COURSE in every case and to take up the FULL COURSE later on.

(43) Boys and girls under 12 should be well advised to restrict themselves to Bhujāṅgāsana, Ardha Śalabhāsana, Dhanurāsana, Paścimatāna, Halāsana and Yoga-Mudrā only. After 12, the remaining exercises of the FULL COURSE may be taken up.

N.B.—The FULL COURSE and the hints given thereon are intended for persons of average health. People falling below the average may try the SHORT COURSE, or better, seek expert guidance and advice for being prescribed suitable exercise.

ĀSANAS

(a) Meditational

(1) PADMĀSANA

Sit with the legs crossed as in the illustration, right foot in the left groin and the left foot in the right groin. Make both heels touch abdomen. Place hands on heels, right on left, palms turned upwards. Fix eyes on the tip of the nose. Touch chest with the chin to form Jālandhara Bandha; contract and lift anus to form Mūlabandha. Stretch yourself tall and straight.

(2) ŚIDDHĀSANA

Sit with legs crossed; but this time, set the left heel against perineum, the left sole touching the right thigh. Set the right heel against the pubic bone. The toes are kept inserted in the folds between calves and thighs, letting only the great toes be seen. Genitals are accommodated under the right foot. Place hands on knees, palms upwards and forming Jñāna-Mudrā as shown in illustration. Eyes are fixed on a point in between eye-brows. Chin is locked against the chest to form Jālandhara Bandha.

(b) Cultural

(3) BHUJĀṅGĀSANA

Lie prone on the ground, forehead touching the floor. Rest palms on the ground by the side of nipples. Throw head back slowly but fully. Shrug shoulders backwards and slowly raise the chest. Raise the abdomen too gradually till the navel is slightly raised. Now keep the whole of the upper part of trunk curved backwards, navel touching the ground, and eyes gazing upwards. Retain for a time and then come down in the reverse order and relax.

(4) ŚALABHĀSANA

Lie prone on the ground, chin touching the floor. Clench fists and press them against the ground. Inhale deep and hold the breath. Stiffen the whole frame and raise both legs backwards and upwards as far as you can. Retain for sometime. Come down and relax.

APPENDIX A

(4a) ARDHA-ŚĀLABHĀSANA

In the same position as above raise only one leg at a time backwards making an angle of 45°. No retention of breath is necessary in this.

(5) DHANURĀSANA

Lie prone, chin resting on floor and arms placed along the body. Raise head. Bend knees and catch the ankles. Raise chest and thighs backwards. Resting the whole body on abdomen. Retain for some time, come down to original position and relax.

(6) HALĀSANA

Lie supine, hands stretched along the body. Raise legs slowly till they make a right angle with the trunk. Then move legs towards the head till the toes touch the ground as near the head as possible. Move toes farther and farther away. When the farthest point is reached, bend arms and prepare a finger-lock close beyond the head. Slide toes to the farthest limit. Come back to original position in the reverse order and relax.

(7) PĀŚCIMATĀNA

Sit on the ground with legs stretched. Hook index fingers and catch the big toes with these hooks. Bend trunk forward and touch legs with forehead. Retain for some time; come back to original position and relax.

(8) ARDHA-MATSYENDRĀSANA

Sit on the ground with legs stretched. Bend right knee and set heel on the perineum. Bend left leg and make it stand by the side of right thigh. Twist trunk to left and pass right arm around left knee, catching left foot in the right hand. Twist trunk still further to left. Whirl the head round to bring the chin over left shoulder. Pass left arm behind the back till you catch the right thigh with left hand. Come back to original position and relax. Repeat the pose on the opposite side starting the technique with the opposite leg and reading right for left and *vice versa*.

(9) MAYURĀSANA

Kneel on ground with knees wide apart. Arrange forearms close together and place hands on the ground, fingers pointing to the legs. Make fulcrum of the two elbow joints and place the mid-point of lower abdomen on this fulcrum. Stretch out the whole body horizontally, balancing it on the forearms. Come back to original position and relax.

(10) ŚAVĀSANA

Lie supine on the ground with hand along the body. Close eyes. Relax every muscle. Breathe slightly deeper and rhythmically and attend to breath. This will help relaxation further.

MUDRĀS AND BANDHAS

(11) VIPARITA-KARANI

Lie supine on the ground with arms stretched along body. Raise legs gradually till they are at 90° with the trunk. Taking support of arms and elbows, raise lower part of the trunk. Support buttocks with hands. Retain for some time. Come back to original position and relax.

YOGIC THERAPY

(12) SARVĀṆGĀSANA

Lie supine on ground with arms stretched along the body. Raise legs gradually till they are at 90° with the trunk. Then, taking support of arms and elbows, raise the whole trunk till it stands erect. Support trunk with brackets of hands from behind. Retain for some time, come back to original position and relax.

(12a) MATSYĀSANA

Form the foot-lock as in Padmāsana. Lie supine on the ground. Make a bridge of the spine by bending the head and the trunk backward. Make hooks of the index fingers and catch in them the opposite big toes.

(13) ŚIRŚĀSANA

Kneel on the ground, haunches resting on heels and feet resting on toes. Prepare finger-lock. Make an angle of 60° on the ground with the forearms, the finger-lock serving as vertex. Place upper and hinder part of the head just in front of the finger-lock. Raise knees, bring toes and thighs nearer to the body. Balance yourself on head with thighs touching the body and legs touching thighs. Open out the thighs bringing them in line with the body. Then, open out the legs, making the whole frame stand vertical. Retain for some time. come back to original position the reverse way and relax.

(14) YOGA-MUDRĀ

Form the foot-lock as in Padmāsana. Behind the back catch hold of the right wrist with the left hand. Bend forward over the heels till you touch the ground with your forehead. Come back to original position and relax.

(15) UDDIYĀNA (in sitting)

Form the foot-lock as in Padmāsana. Bend a little forward, resting the hands on the knees. Exhale completely, contracting the abdominal muscles. Hold breath. Practise mock inhalation by raising the ribs and relaxing the abdominal muscles. The abdomen will wear a concave appearance. That completes Uddiyāna in sitting.

KRIYĀ

(16) NAULI—(Madhyamā, Dakṣiṇā and Vāma)

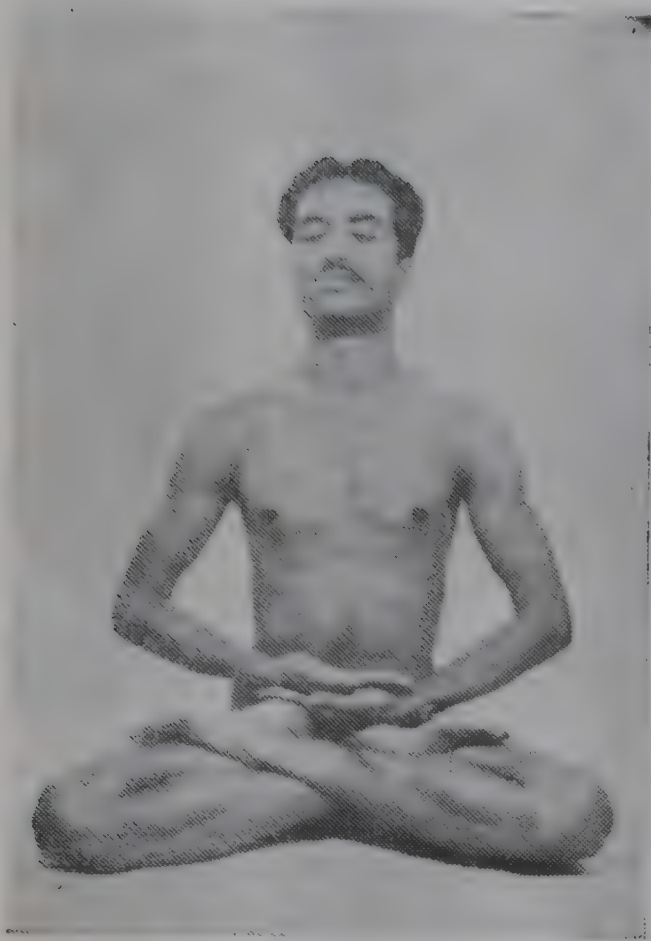
While maintaining Uddiyāna, give a downward and forward stroke to the abdominal recti just above the public bone. While doing this, press the thighs with the hands. The recti will contract and stand out isolated from the other muscles. That completes Nauli-Madhyamā.

While maintaining Nauli-Madhyamā, put more pressure on the right thigh with the right hand, giving a greater bend to the whole body on the right side. Simultaneously relax the left side. This keeps the right rectus contracted, rolling it further to the right, but allows the left rectus to be inactive. That completes Dakṣiṇā Nauli.

While maintaining Nauli-Madhyamā, put more pressure on the left thigh with the left hand, giving a greater bend to the whole body on the left side. Simultaneously relax the right side. This keeps the left rectus contracted, rolling it further to the left, but allows the right rectus to be inactive, that completes Vāma Nauli.

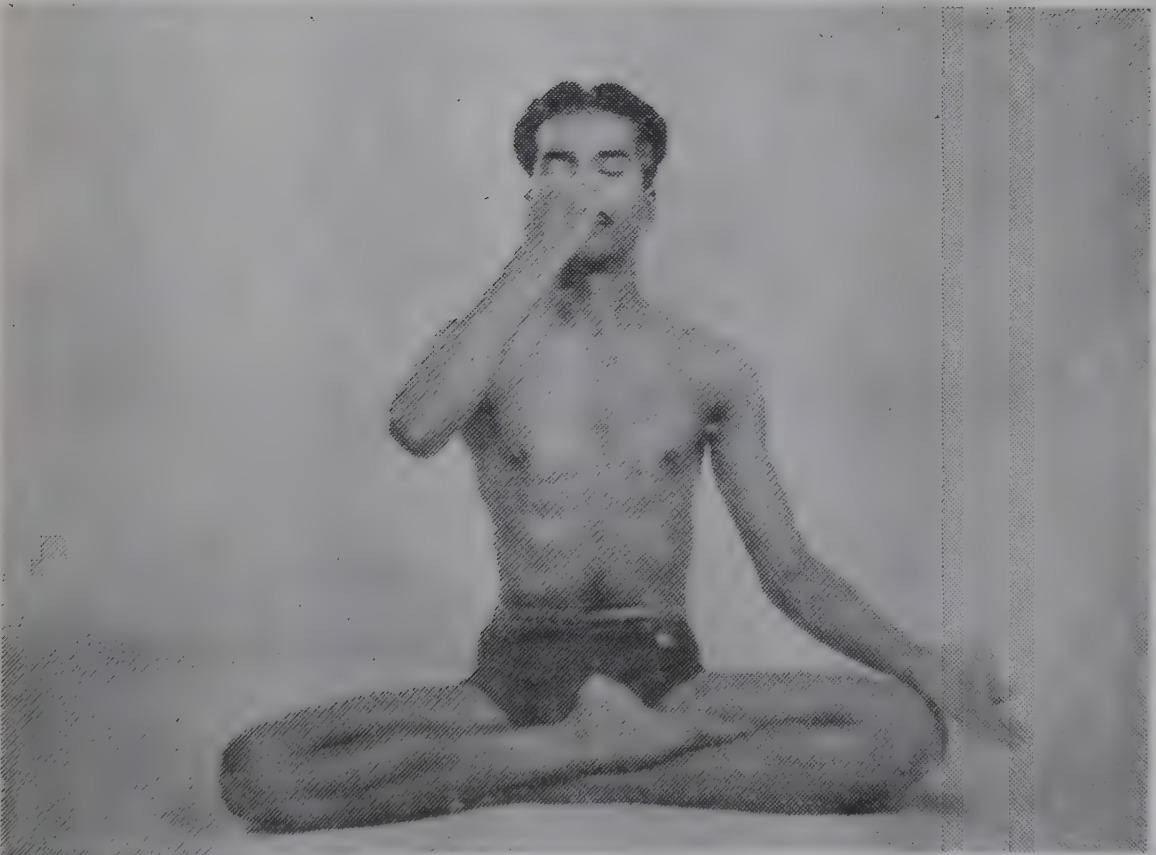
Learn to manipulate from right to left, *i.e.*, Dakṣiṇā, Madhyamā and Vāma rhythmically and expeditiously 10 to 20 times. Then the opposite way, *i.e.*, Vāma, Madhyamā and Dakṣiṇā 10 to 20 times. This forms NAULI-KRIYĀ.

Fig. 1



Padmāsana
(Jālandhara Bandha has not
been shown in the
illustration).

Fig 2



Siddhāsana (with right hand adjusted on the nose for Prāṇāyāma).
(Jālandhara Bandha has not been shown in the illustration).

Fig. 3



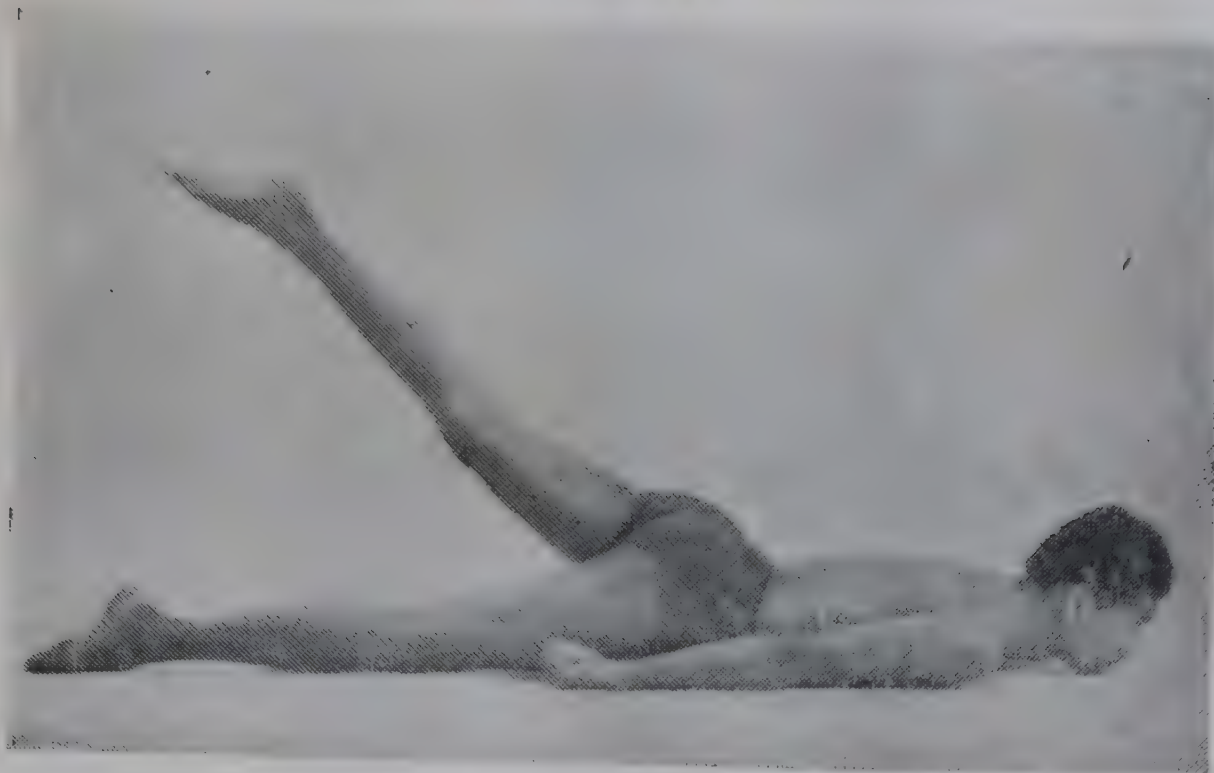
Bhujangāsana

Fig. 4



Śalabhāsana

Fig. 4 a



Ardha-Śalabhāsana

Fig. 5



Dhanurāsana

Fig. 6



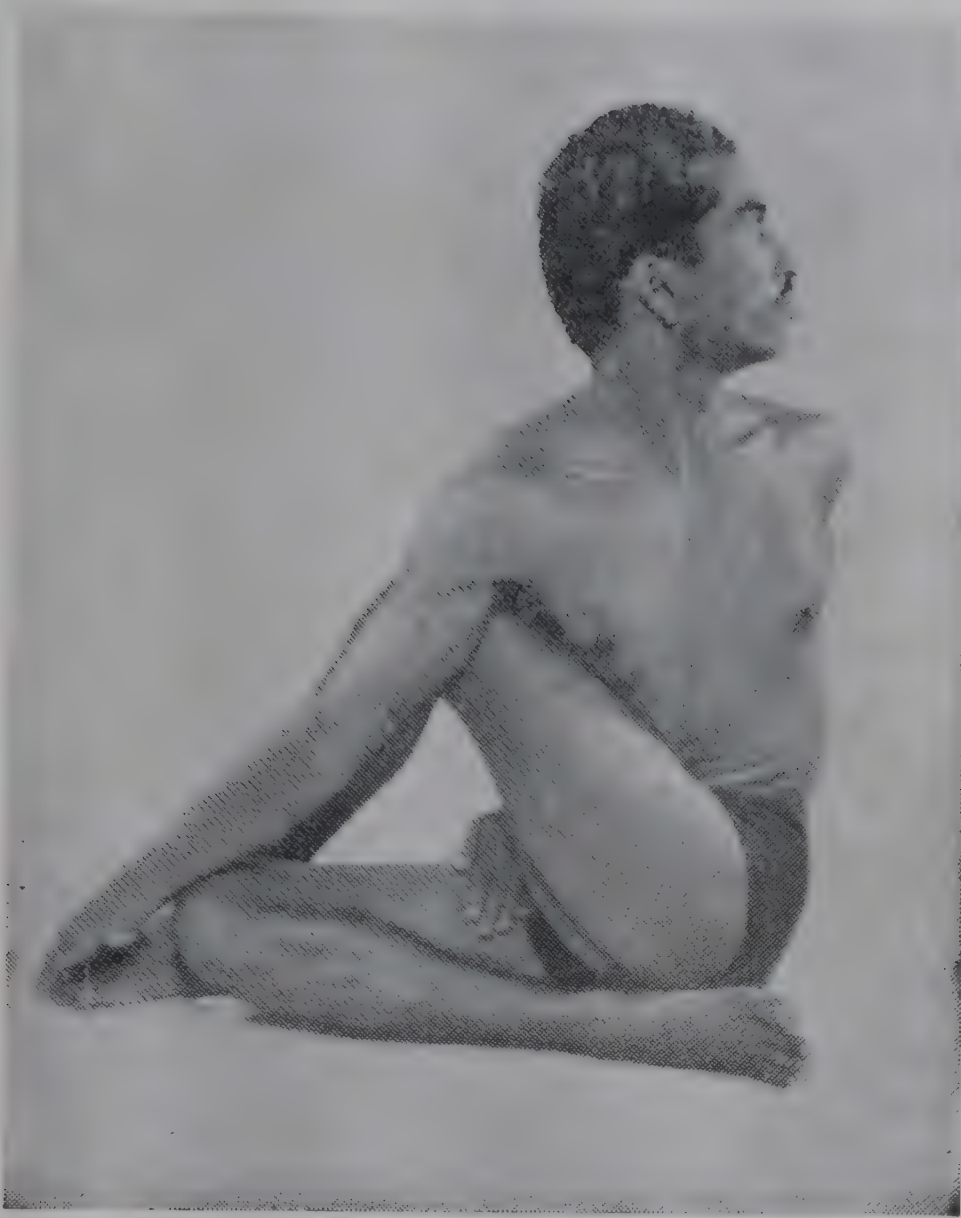
Halāsana (Final Stage)

Fig. 7



Paścimatāna

Fig. 8



Ardha-Matsyendrāsana

Fig. 9



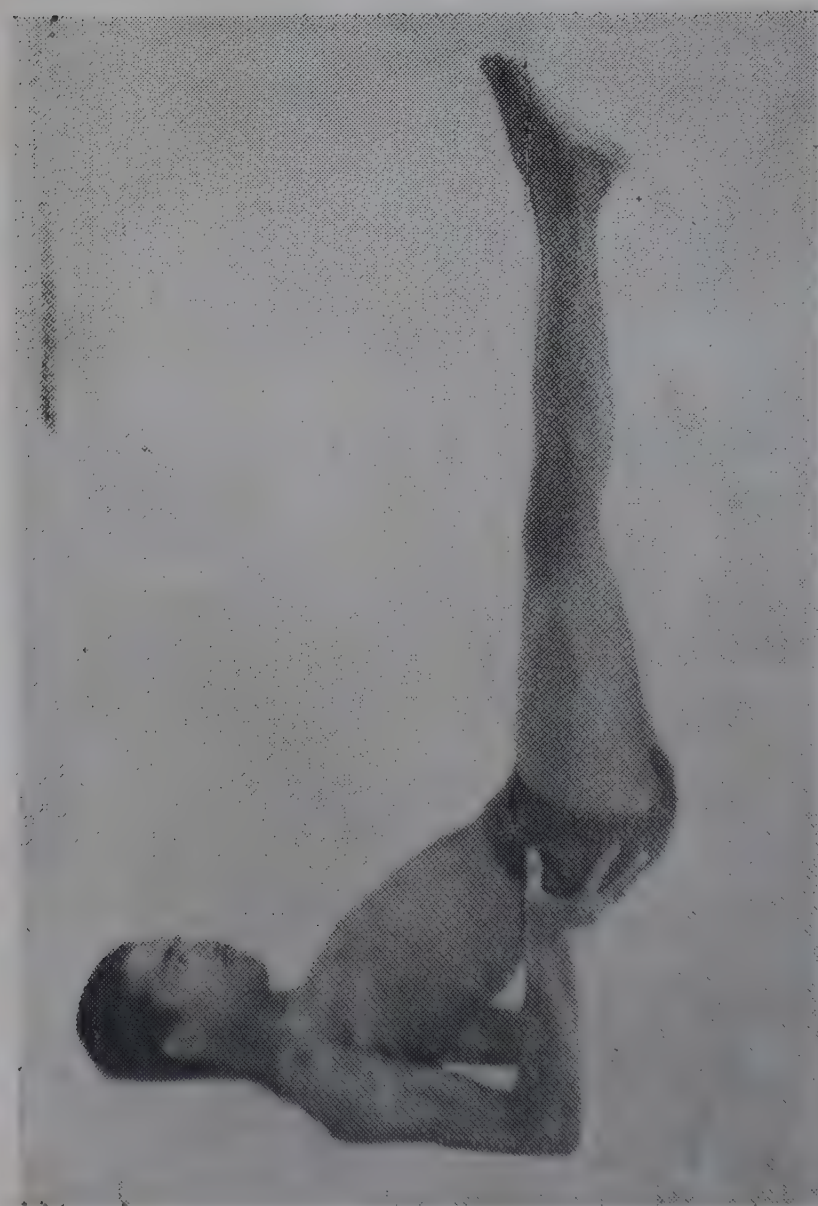
Mayūrāsana

Fig. 10



Śavāsana

Fig. 11



Viparita-Karāṇī

Fig. 12



Sarvāṅgāsana

Fig. 12a



Matsyāsana

Fig. 13



Śīrṣāsana

Fig. 14



Yoga-Mudrā

Fig. 15



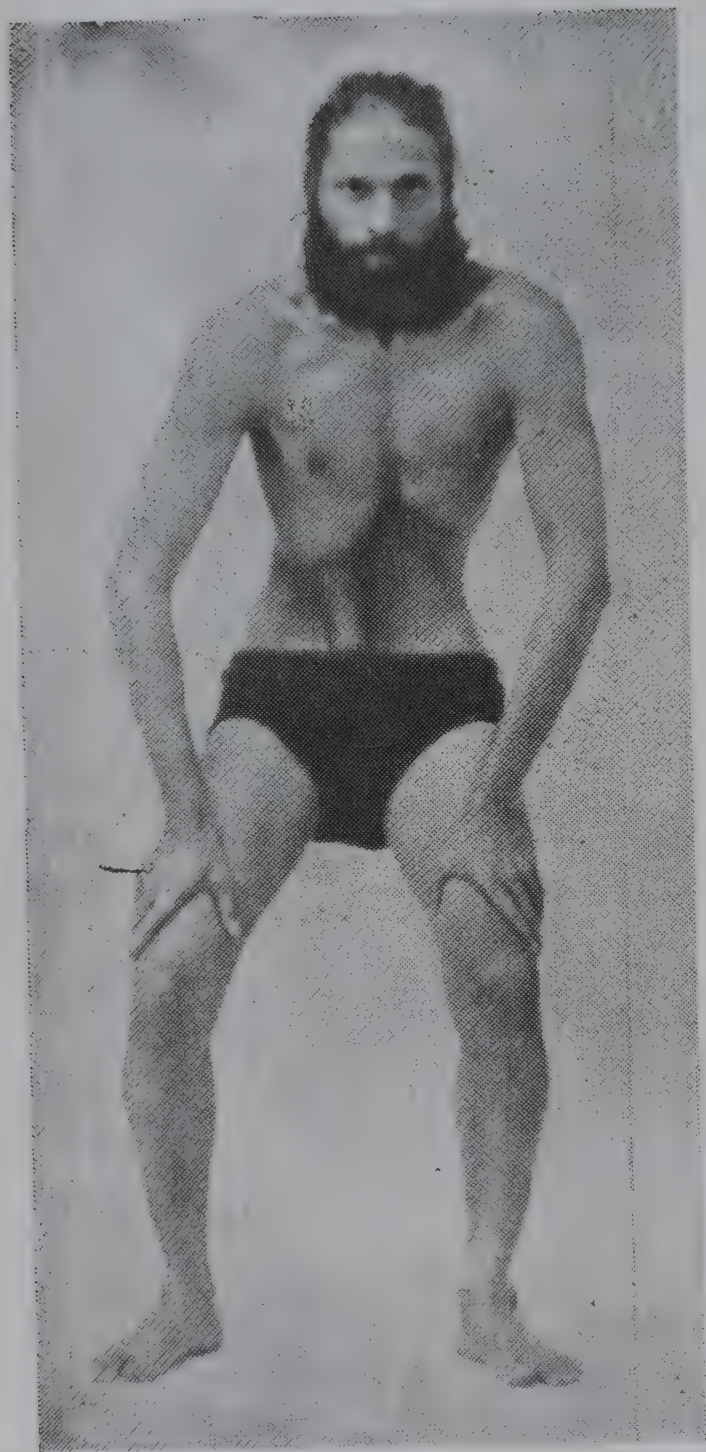
Uddiyāna

Fig. 16



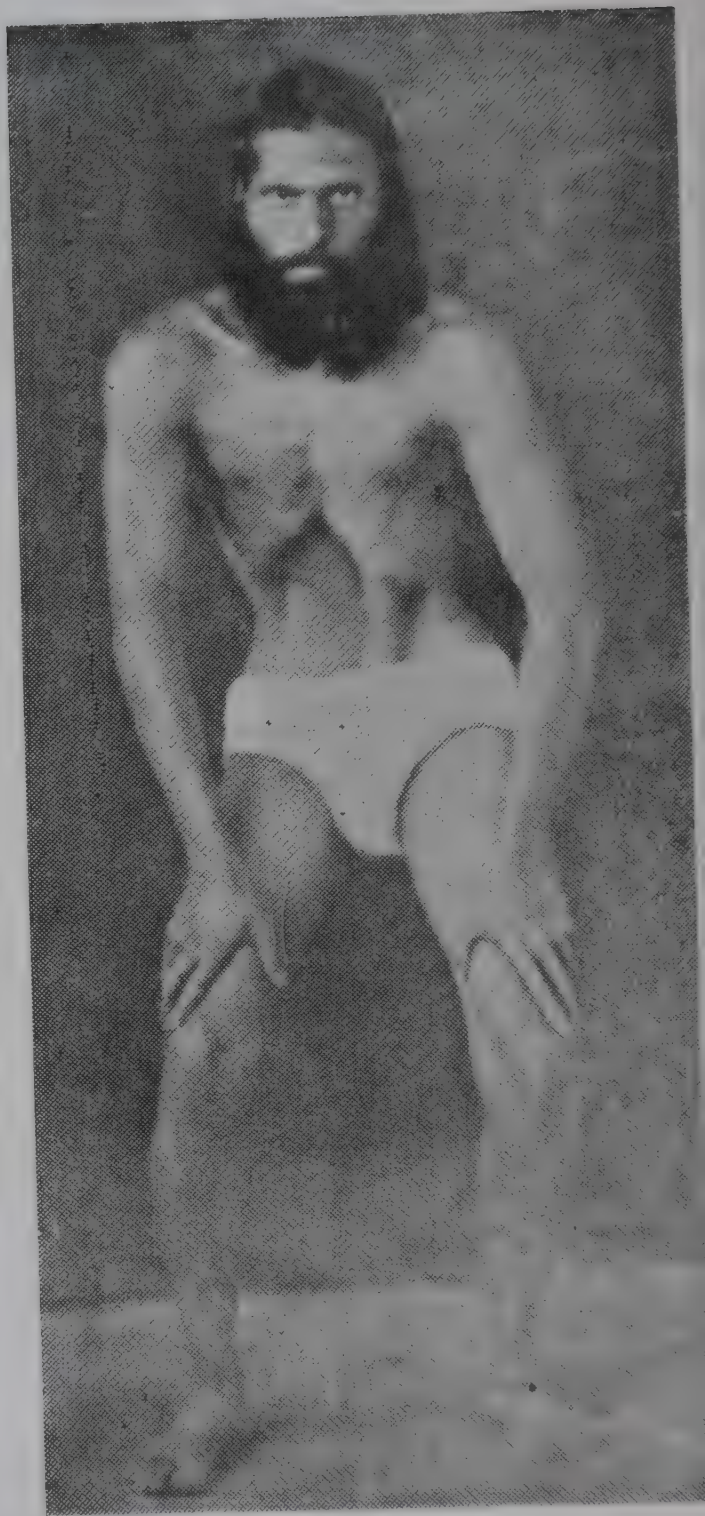
Madhyamā Nauli

Fig. 16a



Dakṣiṇa Nauli

Fig. 16b



Vāma Nauli

APPENDIX B

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APPENDIX C

GLOSSARY

ADNEXA	Accessory parts or appendages of an organ.
ADRENALS; ADRENAL GLANDS	Glands situated on the top of kidneys (ad + renalis : of the kidneys). Their specific secretion is adrenalin,—also called epinephrin.
ADRENAL CORTEX	The cortical (—external) substance of the adrenal glands which has specific secretions of its own; these secretions are collectively called cortin or cortical steroids.
ADRENO-SYMPATHETIC	Pertaining to the activity of adrenal gland and the sympathetic nervous system, both of which are inter-related.
AFFECTO-SYMBOLIC SEGMENT	That part of human nature which gives rise to an affective thinking and behaviour based on certain symbols associated with one's likes and dislikes.
AFFERENT	Conducting nerve impulses from periphery to the central nervous system, or, in CNS, from lower centres to cortex.
'ALPHA' WAVES OR 'ALPHA' RHYTHM (time, amplitude, etc.)	A Particular class of waves obtained in Electro-encephalographs. These waves are 8-12/sec.
ALVEOLI	Air sacs of lungs.
AMBIVALENCE	Co-existence, conscious or unconscious, of opposite feelings or attitudes toward the same person or object.
AMPHOTERIC	Having both acid and basic properties.
ANCILLARY TREATMENT	* Subservient or auxiliary treatment.
ARTERIOLES	Very small arteries.
AUTONOMIC NERVOUS SYSTEM (A.N.S.)	The nervous system supplying and exerting a regulatory influence over involuntary muscles, glands, internal organs etc. This system is divided into sympathetic and parasympathetic nervous systems. (See Central Nervous System).
BARO RECEPTORS	Nerve endings located in the wall of carotid sinus and aortic arch, sensitive to stretching induced by changes in blood pressure etc., from within, or to direct pressure from without. These cause reflex dilatation of blood vessels. Also called Presso-Receptors.

YOGIC THERAPY

BASAL GANGLIA	A term used for certain sub-cortical centres either for Corpus Striatum alone, or for Corpus Striatum and Thalamus taken together.
BRAIN ENZYME	An enzyme is a secretion of living cells which has specific action in promoting chemical changes. Brain enzyme is one which has a specific action on the brain tissues.
BRONCHIOLE	A small sub-division of bronchi (Bronchi are primary branches of the wind-pipe).
CAECUM	The large blind pouch in which the large intestine begins.
CARDIAC SPHINCTER	Sphincter at the lower end of the gullet near the stomach.
CAROTID SINUS	A slight dilatation of the common carotid artery at its bifurcation in the neck. Its walls are innervated and it is concerned with the regulation of systemic blood pressure.
CATHARSIS	In psycho-analysis, a purging of emotions etc. by reviving forgotten or repressed ideas of events responsible for the tensions.
CENTRAL NERVOUS SYSTEM	The part of nervous system consisting of brain and spinal cord (See Autonomic Nervous System).
CEPHALUS	Skull, head.
CEREBELLUM	The inferior part of the brain consisting of two lateral lobes and a middle lobe. This part is mainly responsible for maintenance of balance.
CEREBRO-OCULAR	Affecting the cerebrum and the eye.
CEREBRO-SPINAL IMPULSES	Nervous impulses from spine and cerebrum.
CEREBRUM	The largest portion of brain occupying the whole of the upper part of the skull and consisting of two halves—right and left cerebral hemispheres.
COLON; COLITIS	Large intestine. Colitis is inflammation of colon.
CONVERSION NEUROSIS	A psycho-neurotic disorder in which impulses causing anxiety are converted into symbolic functional symptoms in organs or parts of the body, especially in those under voluntary control.
CORPUS STRIATUM (pl. corpora striata)	A set of sub-cortical (<i>vide-cortex</i>) nuclei, mainly concerned with tonic impulses and some motor functions. It consists mainly of two portions—caudate and lenticular nuclei.

APPENDIX

CORTEX	Surface layer of some organs. Generally used to mean cerebral cortex, <i>i.e.</i> , the external gray layer of Brain. (cf. adrenal cortex, cerebellar cortex).
CORTISONE	A constituent of adrenal cortical extract.
DICHOTOMY	A division into two equal branches, or two opposite entities.
EFFECTOR	A cell, tissue or organ specialised for some form of activity—other than conductivity— <i>i.e.</i> , usually contraction or secretion.
EFFERENT	Conducting nerve impulses from cerebral cortex or lower centres or from spinal cord to muscles and glands.
EGO	Consciousness of self as distinct from others.
EGO-CENTRICISM	Self-centredness.
ELECTRODE IMPLANTATION	Implantation of metal elements (in the brain etc.) through which electric current can pass.
EMPATHY	Power to appreciate and imaginatively experience others' feelings and experiences.
EMPHYSEMA	A condition in which there is overdistension of air spaces in lungs.
ENDOCRINAL	Belonging to ductless glands, <i>e.g.</i> , adrenals thyroid, pituitary, etc., whose secretions pass directly into blood stream.
EOSINOPHILIA	An increase above the normal number of eosinophils, <i>i.e.</i> , certain types of blood cells. This is characteristic of certain diseases, especially certain chronic ones.
ESOPHAGUS	The gullet.
FACILITATION	Furtherence of neural activity through conditioning or by previous stimulation.
FLACCIDITY	Flabbiness.
GASTRUM; GASTRITIS	The Stomach. Gastritis is inflammation of the stomach.
GLOTTIS	The opening between the free margins of vocal folds.
HOMEOSTASIS	Maintenance of steady states in the organism by co-ordinated physiologic processes, integrated by automatic adjustments to keep within narrow limits the disturbances resulting from changes in the surroundings of an organism. This concept was introduced by Walter B. Cannon and has come to be applied to psychological stability as well as physiological steadiness.

YOGIC THERAPY

HYPERCHLORHYDRIA	Excessive acid secretion in the stomach (—of hydrochloric acid).
HYPERTONIA	Excess of muscular tonicity.
HYPERTONIC (SOLUTION)	Exceeding in strength (<i>i.e.</i> , beyond 0.9 gm. of salt in 100 cc. of water).
HYPOGASTRIC REGION	The median region above the pubis and below the navel.
HYPOTHALAMUS	A region in the brain which regulates most of the autonomic functions.
HYPOTONIA	Decrease in muscular tonicity.
IMMUNITY	Condition of a living organism whereby it resists and overcomes infection.
INHIBITION	Reduction in or prevention of response to stimulation.
INTEROCEPTIVE TONIC REACTION	Reaction in the tonicity of muscles as a re- sult of 'messages' from interoceptors, <i>i.e.</i> , receptors in the body that carry messages about the condition of the body itself.
INTRA-GASTRIC	Inside the stomach.
INTRA-PULMONIC	Inside the lungs.
INTRA-THORACIC	Inside the chest.
JUGULAR NOTCH	The depression below the throat and bet- ween the two collar bones.
KAPHA	A tendency of the body to secrete mucus and form tissues (An Ayurvedic concept).
KINAESTHETIC SENSE	The sense of perception of movements, weight, resistance and position.
LABYRINTH	An intricate system of intercommunicat- ing canals and cavities that make up the inner ear and is responsible for the main- tenance of balance.
LARYNX	The Voice-Box.
LEVATOR ANI	The chief muscle of pelvic diaphragm—So called because it helps lift the anus.
LYMPH	A colourless or faintly yellowish fluid in animal bodies.
METABOLISM	The phenomena of assimilation of food- stuffs into complex tissues (anabolism) and of disassimilation of complex sub- stances into simple ones (catabolism) in the production of energy.
MATRIX	That part of tissue into which any organ or process is set.
MEDULLA OR MEDULLA OBLONGATA	The lowest part of the brain just above the spinal cord.
MUCOSA OR MUCOUS MEMBRANE	A lining of various tubular cavities of the body with glands secreting a slimy fluid called mucus.

APPENDIX C

NIDUS	Nest or breeding place.
OCCIPITAL AREA	Area pertaining to the back of the head.
OLFACTORY REGION	Region used in smelling.
ONTOGENESIS	Rules governing individual development of an organised being (as distinguished from phylogenesis) (<i>vide infra</i>).
OSMOTIC PRESSURE	Pressure pertaining to osmosis, <i>i.e.</i> , diffusion of liquids through a porous membrane.
PARAPLEGICS	People with paralysis of lower limbs.
PARIETAL AREA	Area over the parietal bones, <i>i.e.</i> , the one's forming the sides and top of the skull.
PELVIC FLOOR OR PELVIC DIAPHRAGM	Muscles forming the floor of the basin-like bony cavity (pelvis) at the lower end of the trunk.
PHARYNX	The cavity forming the upper part of the gullet, lying behind the nose, mouth and voice-box.
PHYLIC	Pertaining to phylum, <i>i.e.</i> , a main division of animal or vegetable kingdom.
PHYLO-ANALYSIS & PHYLO-SYNTHESIS	Analysis and synthesis of the conduct of man as a phylum.
PHYLOGENESIS	Rules governing the genealogical history of evolution of species of animals or plants.
PLETHYSMOGRAPH	A device for ascertaining the change in the volume of an organ or limb through an increase or decrease of blood therein.
POSTURAL REFLEX	Any one of the many reflexes which are associated in establishing the posture of an individual.
POSTURAL SUBSTRATE	A system of reactivity, mental as well as physical, which forms the background of and determines the whole behaviour of man and his organs.
PROPHYLAXIS	Prevention of disease; measures for such a prevention.
PROPRIOCEPTIVE IMPULSES	Impulses originating in receptors in muscles, tendons, joints and inner ear, and concerned with locomotion and maintenance of posture.
PSYCHIATRY	Treatment of diseases of the mind.
PSYCHO-SOMATIC	Pertaining to mind and body.
RECEPTORS	Cells specialised for receiving stimuli, <i>i.e.</i> , having increased irritability to certain stimuli.
REFLEX	A simple innate response to particular stimuli.

YOGIC THERAPY

SCHIZOPHRENIA	A mental disturbance of reality, relationship and concept formation, affecting on feelings, thinking and behaviour.
SENSORY END-ORGANS	Nerve end-organs carrying sensations.
SEPTAL REGION	A particular region in the brain near about the partition (septum) forming the internal boundary of lateral ventricles (or cavities in the cerebral hemispheres) (<i>vide supra</i>).
SIGMOID COLON	The last part of the large intestine, shaped like the letter 'S' (sigma).
SOMATIC CONDITION	Condition pertaining to the frame work of the body.
SPASTICITY	Increase of tension of muscles with partial or complete loss of voluntary control.
SPONDYLOLYSIS	Dissolution of back-bones.
STRETCH-RECEPTORS	Nerve end-organs carrying sense of perception of stretch in a muscle.
SUBCORTICAL CENTRES	Centres below the cortex of the brain.
TEGMENTUM	A covering in the dorsal portion of mid-brain.
THALAMUS	A mass of gray matter at the base of the brain receiving fibres from all parts of cortex and sending projection fibres to its primary areas, thus acting like a relay centre.
THORAX	The chest.
TOXIC	Poisonous.
TRACHEA	Wind pipe.
TRAUMA	A form of injury.
TREMORS	Trembling of voluntary muscles.
VASO-CONSTRICTION, VASO-DILATATION	Constriction and dilatation of blood vessels.
VASOMOTOR	Regulating the contraction and expansion of blood vessels.
VEGETATIVE NEUROSIS	One of the psycho-physiologic disorders of internal organs where the cause is mostly known to the subject.
VENULES	Small veins.
VIRI	Plural of virus,—a disease producing agent smaller than bacteria.
VISCERA	Plural of Viscus, <i>i.e.</i> , an internal organ.
VOLITION	Exercise of will.

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one's